The Journal

AMERICAN ASSOCIATION
OF NURSE ANESTHETISTS

MAY 1945

VOLUME XIII NUMBER TWO

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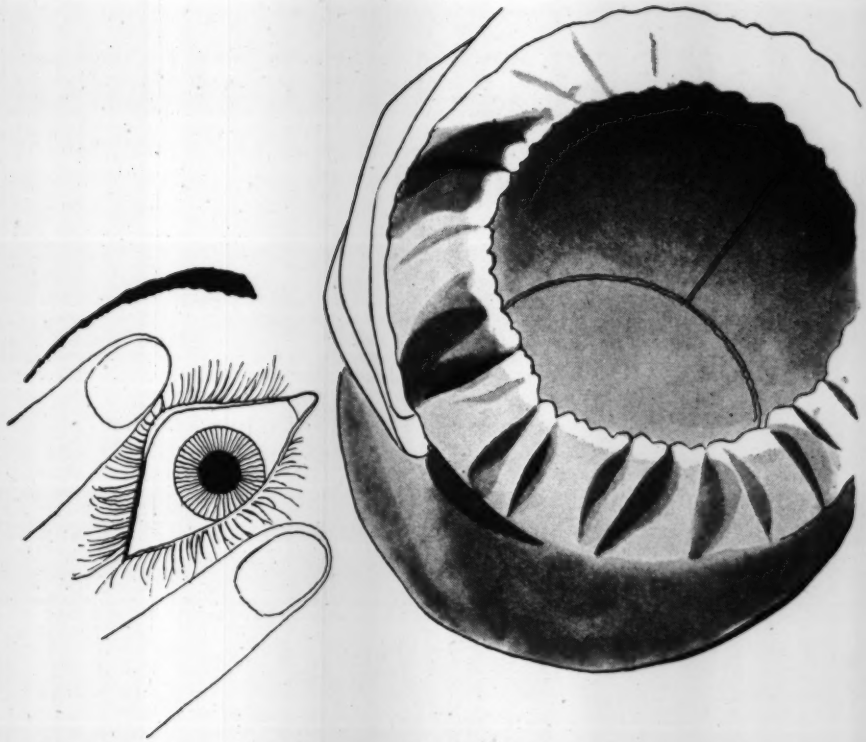

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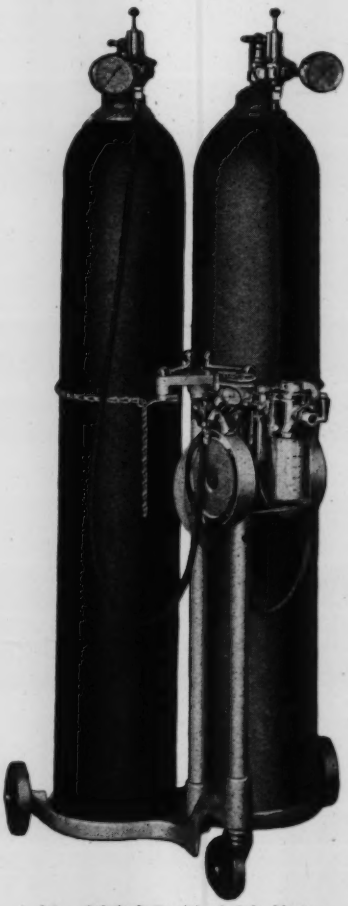

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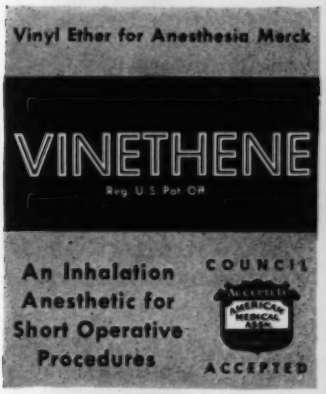

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JOURNAL OF THE AMERICAN ASSOCIATION
OF
NURSE ANESTHETISTS

Volume XIII, Number 2
May, 1945

Published quarterly at 18 East Division Street, Chicago 10, Illinois, by the American Association of Nurse Anesthetists, Anne M. Campbell, Executive Secretary. Edith Helen Holmes, Chairman, Publishing Committee. H. C. Combs, Editor and Manager.

Subscription price to members, 50c per year; to non-members, $1.00 per year; single copies, 50c.

Communications concerning manuscripts or advertising should be addressed to the Editor at 18 East Division Street, Chicago 10, Illinois; those regarding subscriptions or change of address should be directed to the Executive Secretary at the same address.

Entered as second class matter February 8, 1945, at the post office at Chicago, Illinois, under the Act of March 3, 1879.

EXECUTIVE OFFICE
AMERICAN ASSOCIATION OF NURSE ANESTHETISTS
18 EAST DIVISION STREET, CHICAGO 10, ILLINOIS

The Journal OF THE AMERICAN ASSOCIATION OF NURSE ANESTHETISTS

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IN MEMORIAM

Agatha C. Hodgins

Miss Agatha C. Hodgins, founder of the American Association of Nurse Anesthetists, died suddenly at her home at Chatham, Cape Cod, Massachusetts, on March 24, 1945.

Miss Hodgins was born in Canada and educated in Boston, where she received her nurse's training at the Boston City Hospital and Boston Lying-In Hospital. Her connection with the field of anesthesia covers many years. In 1909 she took charge of anesthesia service at Lakeside Hospital in Cleveland, Ohio, and in 1911 began to give instruction to nurses in gas anesthesia. During the first World War she served as anesthetist in France. From 1915 until her retirement in 1933, Miss Hodgins was director of the School of Anesthesia at Lakeside Hospital.

In 1931 Miss Hodgins called a meeting of nurse anesthetists which resulted in the organization of the Association. In 1933, she was made Honorary President of the Association. She served on the Board of Trustees continuously from the time of the organization of the Association until her death. The present issue of *The Journal* announces the fact that she is the first Donor of the Association.

The profound influence of Miss Hodgins is recognized wherever nurse anesthetists serve, and her courage, her strong leadership, and her faith in the ability of nurse anesthetists have earned for her the full respect and the lasting affection of the members of the Association.

Tumors of the Mediastinum

SAMUEL O. FREEDLANDER, M.D.
Surgical Service of Western Reserve University and Cleveland City Hospital, Cleveland, Ohio.

THE MEDIASTINUM is that inaccessible space in the thorax extending from the neck to the diaphragm, bounded by the sternum, anteriorly, and the vertebral column, posteriorly, and laterally, limited by the right and left pleurae. It contains all the thoracic viscera with the exception of the lung, thus serving as the pathway for the heart, great vessels, esophagus and the trachea as well as many important nerves and lymphatics. It contains the thymus gland or its remnants. The space has been somewhat arbitrarily divided into anterior, posterior, superior and middle mediastinum; for practical purposes, however, it is sufficient to speak of the anterior and posterior mediastinum. The clinical importance of the mediastinum may be emphasized by a mere recital of some of the groups of lesions which may occur in it, such as diseases of the mediastinal lymph glands, infections, primary or metastatic, new growths, and granulomata; diseases of the spine; cardiovascular lesions, such as aneurysm; suppuration extending from the neck or adjacent organs; lesions of the esophagus and stomach; aberrant development of the thyroid and parathyroid; thymic tumors, and finally, primary tumors with which this paper is largely concerned.

A simple classification of mediastinal tumors is suggested.

Tumors of the Mediastinum

1. Embryological Rests
   - Dermoid—Teratoma
   - Aberrant Lung Tissue
   - Bronchiogenic Cyst
   - Aberrant Lobe
2. Neurogenic Tumors
   - Neurofibroma
   - Ganglioneuroma
   - Sympatheticoblastoma
3. Connective Tissue Tumors
   - Lipoma, Xanthoma
   - Fibroma—Fibromyoma
   - Lymphangioma—Hemangioma
   - Sarcoma
4. Primary Tumors of Lymph Nodes
   - Hodgkin's Disease
   - Lymphosarcoma
   - Endothelioma
   - Boeck's Sarcoid
5. Primary Tumors of the Thymus
6. Carcinoma of Mediastinum
   - Primary
   - Secondary
7. Echinoccic Cysts
8. Intrathoracic Goitre
9. Parathyroid Adenoma

The surgical significance of tumors of the mediastinum lies in the fact that

Read at the annual convention of the American Association of Nurse Anesthetists held in Cleveland, Ohio, October 2-5, 1944.

many of them are benign and can be successfully removed with comparatively little risk. Complications in neglected benign tumors, however, such as infection, pleural involvement and malignant change, may increase the surgical risk and alter the prognosis unfavorably. Unfortunately, it is often impossible to differentiate benign tumors from non-surgical lesions by history, physical examination, x-ray or other diagnostic procedures. It is important, however, not to dismiss a tumor of the mediastinum as inoperable or hopeless without excluding every possibility of its being a benign removable lesion.

Symptoms and Signs

The mediastinum may contain benign growths which are entirely without symptoms. Congenital tumors such as dermoids and teratomas may give rise to no symptoms before puberty while neurogenic growths in the posterior mediastinum may produce symptoms in infancy or childhood. The physician is often greatly surprised at finding on a routine chest film, a large mediastinal growth. When symptoms occur, they are chiefly due to pressure. The complaint may be of substernal pressure and pain radiating to the arms and the shoulders, an irritative nonproductive cough and shortness of breath. Occasionally there is hoarseness or difficulty in swallowing.

Cyanosis of the neck and face, with distension of the veins of the neck and anterior chest wall may appear if the superior vena cava is compressed. Horner's syndrome suggests a lesion in the posterior mediastinum. The expectoration of hair may prove the diagnosis of dermoid.

Physical examination may show nothing or there may be asymmetry of the chest, diminished mobility with dullness and distant or absent breath sounds over the area involved.

All the symptoms and signs may be altered and confused if the tumor becomes infected and establishes a connection with the bronchial tree or pleural cavity. The symptoms of infection together with the signs of pneumonic and pleural involvement may so dominate the picture that it may be difficult to establish the presence of the growth.

After aspiration of pleural effusion and air replacement, x-ray may reveal the original mediastinal shadow. Often the diagnosis cannot be made under these circumstances without operation.

In all cases of myasthenia gravis a tumor of the thymus, usually benign, must be suspected. Reports show that over 50 per cent of these cases have benign thymomas. Blalock[1] has reported the removal of such a lesion with prolonged arrest of the disease. Blalock's recent experience suggests that the thymus must be explored in all cases of true myasthenia gravis.[2] We have observed two cases of myasthenia gravis, recently, which at autopsy showed benign thymic tumors.

Neck dissection in cases of hyperparathyroidism may reveal no adenoma above the clavicle or in the posterior mediastinum. Experience has shown that in about 10 per cent of the cases, the tumor will be in the anterior mediastinum.[3] Recently we found a parathyroid adenoma, after splitting the sternum, situated just below the left innominate vein.

Diagnosis

While the symptoms and signs may suggest a mediastinal tumor, the diagnosis as to the type of tumor and the

location cannot be made by them alone.

X-ray examination in different planes is the most essential procedure. In many cases for accurate localization, this must be supplemented by bronchoscopy, bronchography and arteriography. The picture of a sharply circumscribed, spherical, non-pulsating tumor in the anterior mediastinum suggests a teratoma; the same kind of shadow in the posterior mediastinum probably represents a neurogenic tumor. A tumor mass present in the midst of the mediastinal contents often is a lymphoblastoma, a metastatic gland or aneurysm. With the exception of these few hints, all the diagnostic procedures may not be adequate enough to establish the type of tumor. However, a well circumscribed growth in the anterior or posterior mediastinum is usually benign and deserves surgical exploration. The decision regarding shadows in other locations or having ill-defined outlines requires a thorough study of the whole picture and often must be left to the judgment of the thoracic surgeon. Occasionally aspiration biopsy is indicated. However, it is only of value if positive and is attended by some danger. Arteriograms may be necessary to rule out aneurysm in centrally placed lesions.

Prognosis and Treatment

Should an asymptomatic benign tumor of the mediastinum be operated upon when it is discovered during the course of a physical or x-ray examination?

While these growths may remain quiescent over a long period of time, statistics seem to show that in most cases the growth will cause death by increase in size, malignant degeneration or infectious complications. Heuer and Andrus[4] observed that in 217 cases of dermoid cysts reported in the literature, forty-seven patients who were untreated, died of the disease. In eighteen cases of fibroma of the mediastinum, the thirteen patients who were not operated upon, died because of the growth.

Consequently surgery must be considered in all cases of mediastinal tumors, regardless of the symptoms.

X-ray treatment may be useful in ruling out lymphoblastoma. It is wise not to give it, however, until after the patient has been seen by a thoracic surgeon. The benign tumors will not respond to x-ray treatment.

Operation should be recommended for all benign tumors such as teratomas, neurogenic tumors, cysts, lipomas, intrathoracic goiters, thymomas, et cetera. The malignant tumor and lymphoblastoma should not be operated upon if the diagnosis can be established in any other way.

Operation

A mediastinal tumor may be approached extra-pleurally or transpleurally. Since in most cases, whatever the method of approach, one or both pleural cavities may be opened, the same preoperative and operative precautions must be taken as for any operation with an open pleural cavity. Whatever remarks are made concerning operations on the mediastinum would also apply to operations upon the other thoracic viscera. We have tried to develop a procedure which would be suitable for the general hospital having only occasional cases of major thoracic lesions and suitable for the average, well-trained anesthetist, with a wide experience in general surgery and perhaps a limited experience in thoracic surgery.

The patient with an operable thoracic

lesion is apt to be a poor risk from the standpoint of the anesthesia. He has had a protracted illness which has decreased the respiratory function of the lung. There is apt to be mucus, pus or blood in the bronchial tree, coughing is frequent and finally, he must be operated upon with the good side down, further decreasing his respiratory activity. The chief hazards in regard to the anesthesia are anoxia and circulatory strain, secretions in the airway, and troublesome reflexes. The preoperative medication and anesthetic procedures must be planned to obviate these dangers as far as possible.

Preoperative Preparation

Morphine and atropine or morphine and scopolamine, depending upon the amount of secretion are used as preoperative medication. Atropine may help to depress annoying reflexes and decrease the secretions. On the other hand its synergistic action with morphine is not as great as that of scopolamine. We deprecate the routine use of the barbiturates or avertin because of the occasional unpredictable reaction from these drugs. Induction of anesthesia is obtained with nitrous oxide and then continued with oxygen and ether. We are well acquainted with the merits of cyclopropane. However, with ether or cyclopropane, a high percentage of oxygen can be given to any desired depth of anesthesia. Cyclopropane is reputed to increase the irritability of the heart muscle while ether is presumed to be more irritable to the mucous membranes. It is our belief that the irritation of the respiratory mucous membrane by ether has been exaggerated.

The patient is kept in partial Trendelenberg position at about a 15° angle. Postural drainage is given routinely and assiduously before the operation and repeated again in the operating room before the anesthetic is started. An intratracheal tube should always be used because it maintains a patent airway; positive pressure can be given when needed and when necessary for emergency artificial respiration, and it serves as a passage-way for the aspiration of pus, mucus and blood. Secretions must be aspirated frequently, particularly with any change in position, before, during and after the operation. To obviate atelectasis the lung should be inflated at frequent intervals. The pharynx must also be aspirated frequently because secretions will come up around the intratracheal tube. An inflatable cuff should not be placed around the intratracheal tube because of the danger of secretions accumulating below it.

The troublesome reflexes causing apnoea, cough or cardiac irregularity may be initiated from the chest wall, from irritation of the phrenic nerve or from the hilus of the lung. These can be controlled to some extent by the injection of procaine in the intercostal space on either side of the rib resected before the rib spreader is inserted and by the injection of procaine into the phrenic nerve and subpleurally around the hilus. The lung is completely inflated before the closure of the wound. The intratracheal tube is not removed until the patient is placed over into the bed position. If the respiratory tree does not seem free of secretions, bronchoscopy is done before the patient leaves the operating room. Postoperatively, the patient is kept in the head-down position, on the operated side, until the cough reflex returns. If there is any difficulty in raising secre-

tions, the trachea is aspirated or bronchoscopy is performed.

The technical aspects of the operation will not be discussed.

Conclusion

The differential diagnosis of tumors of the mediastinum is difficult. Unless the lesion can be proved to be malignant, a lymphoblastoma or an aneurysm, it should be explored. Benign tumors can be surgically removed with a low mortality rate.

Case I. R.P.—A twenty-two year old female was first seen on April 19, 1944. Following the birth of a child eight months previously, she developed an irritative cough and expectoration of mucoid sputum. There was no previous history of cough, shortness of breath or pain. Her exercise tolerance during childhood was excellent. She participated in all the usual activities without complaint.

Physical examination was negative except for impaired resonance to the right of the sternum in the second and third space with diminished breath sounds over this area.

Roentgenograms show a lobulated tumor mass along the right side of the heart, roughly 12 x 5 x 6 cm. There are several teeth recognizable as molars in the upper part of the tumor and an irregular mass of bone. The margin of the tumor is sharply defined and contains no calcium. The surrounding lung and the pleural sinuses are clear.

Operation (June 19, 1944):

An anterolateral approach was made through the fourth interspace. A tumor with a thick capsule was found very adherent to the lung, pericardium and diaphragm. By sharp dissection a line of cleavage was developed and the tumor was removed. A small section of the capsule could not be separated from the pericardium. Closed drainage was instituted and the chest closed.

Pathological (Gross examination):

The specimen consists of an irregular mass weighing 300 grams. It is covered by soft white skin, hair and sebacous material. Lying free in the cyst is a section of bone to which two teeth are attached.

(Histological examination):

The lining of the cyst consists of stratified squamous epithelium like that of epidermis. In the adjacent connective tissue are numerous hair follicles and sebaceous glands. The connective tissue is focally infiltrated with lymphocytes and large mononuclear cells. The underlying fibro-adipose tissue is of mature type.

Diagnosis: Dermoid Cyst

Case II. A.L.—A fourteen year old male was first seen on December 17, 1935. For several months he had pain in the anterior portion of his left chest which was intermittent and more pronounced after exercise. The pain was sharp but not disabling and did not prohibit his usual activities. There was no cough, expectoration or shortness of breath.

Physical examination revealed diminished movement of the anterior portion of the left chest on respiration. Flatness to percussion over the left anterior chest with absent breath sounds and fremitus were demonstrable.

Roentgenograms showed a large rounded shadow with homogeneous density extending from the left mediastinum to the axilla and from the second to the sixth rib anteriorly. On the lateral view the shadow is definitely

anterior. There is no displacement of the heart or mediastinum.

Operation (January 8, 1936):

Posterolateral incision in the sixth space. A large irregularly shaped tumor was found lying between the lobes of the left lung and attached to the pericardium and mediastinum. The tumor was separated by sharp and blunt dissection, apparently with the capsule intact. Closed drainage was instituted and the chest closed.

Pathological (Gross examination):

The specimen consists of an irregularly rounded firm mass weighing 385 grams and measuring 13 x 12 x 8 cm. The surface is irregular and greyish yellow. The whole mass appears to be well encapsulated. On section there are numerous pockets containing yellowish grey cheesy material. Occasional hairs are seen. Tissue cuts with varying resistance suggesting areas of calcification.

(Histological examination):

The sections show stratified squamous epithelium with sebaceous suderiferous glands and hair follicles. There are areas resembling intestinal mucosa and adjacent to this, there are areas of transitional epithelium of the bladder.

Brain tissue is recognizable in addition to islands of smooth muscle, nerve and mucoid tissue. Some of the tissue resembles bronchus. In some places there is cartilage and actual bone formation.

Diagnosis: Teratoma

Subsequent History:

This patient remained clinically well and an x-ray taken in December, 1936, showed no evidence of recurrence and the left lung field was clear.

In September, 1942, the patient reported that while being examined for the Army, the chest roentgenogram showed a tumor mass in his left chest. He felt perfectly well with the exception of occasional pain which radiated up to the shoulder and down the left arm. Films taken at this time showed a sharply defined circular shadow of homogeneous density extending laterally from the left hilus to the mid clavicular line of the left hemithorax. The lateral margins were fairly sharply defined and the mesial margin merges with the shadow of the mediastinum. The lungs are otherwise clear.

The patient at this time was suffering from hay fever and therefore was advised to return after the hay fever season for another x-ray and probable exploration.

A roentgenogram on October 26, 1942, showed considerable increase in the size of the mass in the left upper anterior mediastinum. In addition, there was a large rounded nodule of increased density in the medial portion of the right base, indicative of metastasis.

In view of the findings, x-ray treatment was advised and the patient received an intensive course of x-ray treatment. He began to lose a great deal of weight and complained of weakness and abdominal pain. On January 10, 1943, he was re-admitted to the hospital and physical examination at that time revealed large firm lymph nodes in both axillae, impaired resonance and diminished breath sounds anterior left and posterior right chest. In the subcutaneous tissue of the right upper quadrant of the abdomen, there was a small hard nodule.

Tests for gonadotropic hormones were made and found to be present in large quantities in the urine.

Blood assays were attempted but were not satisfactory.

The patient died on January 27, 1943.

The summary of the postmorten report is as follows:

Pathological Diagnosis

Chorionepithelioma arising in the superior mediastinal teratoma with metastases to the lungs, right parietal pleura, diaphragm, liver, kidneys, greater omentum, jejunum, ileum, mesenteric lymph nodes, left deltoid muscle and subcutaneous tissue of the anterior abdominal wall.

Gynecomastia, bilateral.

Fibrosis and interstitial cell hyperplasia of testes.

Bronchopneumonia.

Healed, non-deforming endocarditis of all four valves.

Primary tuberculous lymph nodes, inferior bifurcation and right upper bronchopulmonary, inactive.

Miliary tubercles of spleen, inactive.

Small cavernous hemangioma of the liver.

Fibrous pleural adhesions, left.

Comment:

It is impossible to decide whether the chorionepithelioma represents a recurrence of the teratoma or was a new growth. The fact that the first tumor was so well encapsulated and showed no evidence of malignancy histologically, together with the fact that the patient was free from symptoms for such a long period would be evidence against a recurrence. The absence of any other primary growth at the postmortem makes doubtful the possibility that the chorionepithelioma had its origin in another place than the mediastinum.

The presence of a large amount of gonadotropic hormone in the urine is interesting but consistent with the findings of chorionepithelioma originating elsewhere.

This itself may be of some slight differential diagnostic importance in mediastinal tumors.

Case III. J.P.—A sixty-five year old male had been troubled for fifteen years by a chronic cough productive of yellowish mucopurulent sputum, occasionally blood-streaked. He had had dyspnea but his general health had been good. There was no marked shortness of breath at rest. No loss of weight was admitted.

The physical examination revealed marked distention of the veins of the neck. The patient had a barrel-shaped chest. There was a rounded prominence on the anterior portion of the right chest next to the sternum, which was covered with lacework of dilated veins.

Examination showed that the urine, red blood count, white blood count and the hemoglobin were normal. The basal metabolic rate was minus eight. The most striking sign was marked dilatation of the neck veins with evidence of collateral venous distention on the anterior surface of the chest. There was some bulging of the anterior portion of the right chest in the region of the first and second ribs. There was no abnormal pulsation. Examination of the heart and lungs revealed emphysema.

Roentgenograms of the chest revealed a large spherical shadow of increased density in the anterior portion of the upper mediastinum measuring about 13 cm. in diameter. The shadow was situated just above the anterior portion of the aortic arch, displacing the arch downward and the esophagus and trachea to the right and posteriorly. The lumen of the trachea was nar-

rowed. The peripheral portion of the shadow contained linear areas of calcification. Fluroscopically, there were no pulsations.

Diagnosis: Mediastinal Dermoid Cyst

Operation (April 19, 1940):

A curved incision was made in the left anterior chest from the clavicle to the third rib. The second cartilage was resected. Extra-pleurally, a large tumor mass was developed predominately crossing over the lower portion of the tumor. The mass was well encapsulated and easily dissected from the surrounding tissues. There was a pedicle at the left upper pole which was clamped and ligated.

Pathological (Gross examination):

The specimen consists of a cyst measuring 9 cm. in diameter. The external surface is mottled and yellow. The wall of the cyst varies from 1 to 5 mm. in thickness. The contents are a pinkish fluid in which there are suspended white minute crystals. The wall is studded with hard, pearly-white nodules which in places show a trabeculated pattern.

(Histological examination):

The cyst is lined by a thin layer of hyalinzed amorphous material with no evidence of epithelium. Beneath this layer, there is a narrow margin of tissue comprised of small thyroid acini-lined by low cuboidal epithelium. There is an occasional small focus of calcium.

Diagnosis: Cystic Microfollicular Adenoma of Thyroid

Comment:

This patient presented no signs of enlarged thyroid above the clavicle and no symptoms of hyperthyroidism. The circumferential calcification can also be found in aneurysms and teratomas.

Case IV. K.D.—A twenty-nine year old female, admitted to Cleveland City Hospital on June 16, 1939. For several years had complained of a backache which had become more severe recently. Physical examination was negative. X-ray examination revealed a dense circular shadow in the left subapical region posteriorly.

Through a posterior incision, small sections of the fifth and sixth ribs were removed exposing a hard grayish-white encapsulated tumor firmly attached to the fifth intercostal nerve near the forearm. It measured four centimeters in diameter. Histologically it proved to be a neurofibroma. Recovery was rapid and complete.

Case V. P.P.—A forty-one year old male was admitted to Lakeside Hospital on June 13, 1938.

Six months previously he developed an irritative non-productive cough and a feeling of fullness in his right lower chest. These symptoms were not marked but he was advised by his local doctor to have an x-ray examination.

The roentgenograms revealed a shadow in the right lower anterior mediastinum. Without further attempts at diagnosis, he was advised by his doctor to have x-ray treatment and a rather intensive course was given with no diminution of the size of the tumor mass. However, the patient developed a severe anemia, symptoms of which were worse than those of the tumor mass. When he was admitted to the hospital, his complaint was that of fatigue, shortness of breath and weakness.

Physical examination revealed diminished movement of the right lower chest. There was dullness to the right

of the sternum between the third and fifth ribs with suppressed breath sounds. Laboratory examination showed the red blood count to be 2,200,000. The hemoglobin was 38 per cent and the white blood count 5,750 with the differential normal. After he had several blood transfusions, an exploration of the chest was undertaken.

A roentgenogram taken May 20, 1938, is as follows:

Fluroscopic and film examination show that in the position of the right middle lobe, there is a large dense shadow which measures about 10 cm. horizontally. The upper and lateral margins as well as the posterior margin are sharply delineated. The esophagus is not displaced. The findings could be due to a cyst or cystic tumor of the right lung.

Operation (June 25, 1938):

An anterolateral incision was made on the right entering the fifth interspace. The cartilage of the fifth and sixth ribs was divided. There was a firm pyramidal shaped mass about 12 cm. in diameter with the capsule adherent to the pericardium and loosely adherent to the middle and lower lobes. The mass was easily shelled out and the wound closed without drainage.

Pathological (Gross examination):

The tumor mass weighs 410 grams and measures 13 x 11 x 5 cm. It has a distinct fibrous capsule with several nodular projections. A cut surface showed islands of yellowish-grey tissue surrounded by fibrous connective tissue. There were numerous small cystic areas.

(Histological examination):

The capsule was comprised of dense fibrous connective tissue which surrounds but is not infiltrated with cells of polyhedral and spherical shapes arranged in fairly solid masses. In some places there was a suggestion of alveolar arrangement of the cells.

A conspicuous feature of the sections is the large number of greatly dilated vascular channels presumably lymphatics. These channels are lined with a low cuboidal type of endothelium and contain a pink staining, homogeneous material. No blood is contained within them.

Diagnosis: Lymphangioendothelioma

The patient made an uneventful recovery from the operation but his aplastic anemia still persists and he is still receiving periodic transfusions.

No comment can be added to this case except to reiterate that queer things can be found in the anterior mediastinum.

Case VI. G.R.—A twenty-one year old female was admitted to Cleveland City Hospital, May 6, 1936.

Shortly after the birth of her baby six months previously, the patient developed a cough which had persisted. The cough was continuous and only very slightly productive of mucoid sputum. There had been no hemoptysis. Precordial pain and palpitation had occurred occasionally. There had been a weight loss of thirty to thirty-five pounds associated with loss of strength. Night sweats have been more severe during the last two months.

On admission the temperature was 38° centigrade, the pulse rate 90 and the respiration 20. The red blood count was 4,090,000 and the white blood count 17,500.

Physical examination revealed considerable emaciation although the patient did not appear acutely ill. The positive findings were dullness over the

left anterior chest just below the clavicle with diminished breath sounds over this area.

Roentgenogram (May 7, 1936), was as follows:

Fluroscopic and film studies of the chest show a large rounded shadow of increased density measuring about 10 cm. x 6½ cm. extending from the upper portion of the left hilus. This shadow shows a slight pulsation fluroscopically apparently transmitted from the aorta.

There is extensive irregular calcification in both hilus regions extending upward into the left apex which represents an old healed tuberculous process. The shadow extending from the left hilus has the appearance of a tumor, probably a lymphoblastoma.

A lateral view of the chest (May 12, 1936) shows a tumor mass to lie in the anterior position. There is a large amount of calcification in this region that appears to lie within the tumor. This suggests the possibility of a tuberculous process.

Up until May 23rd no sputum could be obtained for examination.

On May 23rd, the patient coughed up a half ounce of thick tenacious yellow material. It contained no tubercle bacilli or other organisms. It consisted of amorphous material.

The patient was given six x-ray treatments over the mediastinum with no effect on the size of the tumor.

Roentgenogram (May 25, 1936):

A film of the chest shows a decrease in the size of the mass in the left upper mediastinum now measuring 4 x 6 cm. In the lateral view there is an area of diminished density with a straight line lower border which represents a cavity communicating with the bronchus.

A tentative diagnosis of teratoma of the mediastinum with rupture into the bronchus was made.

Operation (June 13, 1936):

An incision was made over the left third intercostal space. The pleural cavity was entered and a tumor mass covered with pleura lying anteriorly and medially, brownish in color and firm, was adherent to the lower lobe and mediastinum, as well as the chest wall. The densest adhesions were in the left hilus region. The mass was freed by blunt and sharp dissection and was closely adherent to the left pulmonary artery and vein. During the course of dissection, the tumor mass was opened and approximately one ounce of coarsely granular, caseous material exuded. The chest was closed and intercostal closed drainage established in the lower left chest.

The patient made a good recovery and was discharged on July 6, 1936.

Pathological (Gross examination):

The specimen consists of a mass of tissue measuring 11.5 x 7.5 x 3.5 cm. having the shape of a large thymus. It has even the shallow median fissure suggesting a bi-lobed structure. The organ is dark red to dark maroon, slightly nodular and of fleshy, firm consistency and the more concave surface shows irregular fresh evidence of incision. Elsewhere the entire surface is covered with a thin glistening membrane. The dark maroon color is mottled. Hemisection reveals the entire mass to be occupied by numerous small cavities of intercommunicating trabecular architecture which are filled by numerous clusters of calcified material varying from white to dark yellow in color. Some surfaces lining these cavities, the average size of which is 1 cm., are dark brownish-gray, smooth

and glistening while the majority show inner surfaces which are irregular and necrotic. Sections of the trabeculae reveal firm, glistening brownish-gray to blackish-gray tissue having fibrous consistency and in some areas, which appear more fleshy, has a firm, glistening, hyperemic appearance. In no area is it possible to detect actual colloid containing tissue. Section is taken of a more fleshy area to avoid calcium.

Impression:

1. Involuted thymus with degeneration, necrosis and calcification.
2. Involuted thymus with necrosis and calcification.
3. Chronic healed mediastinitis with necrosis and calcification.

(Histological examination):

Atelectatic congenitally malformed lung showing active conglomerate tuberculosis and numerous areas of calcification.

Subsequent History:

The last examination of this patient was on August 11, 1936, at which time she was feeling well and had no complaints.

Comment:

The occurrence in many forms of accessory and aberrant pulmonary remnants in the mediastinum must be borne in mind in the differential diagnosis of mediastinal lesions. The author together with Dr. Paul W. Gebauer[5] described some of these manifestations a few years ago.

The most frequently encountered condition is that of a bronchial cyst which may or may not be connected with the bronchial tree. It is often silent clinically unless secondary infection ensues.

This specimen was not directly connected with the bronchial tree so that the tuberculosis must have occurred by the hematogenous route.

The occurrence of a completely aberrant pulmonary lobe is infrequent enough. The addition of tuberculosis in it certainly makes it rare. No apologies are offered for not having made a preoperative diagnosis.

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Tri-State Assembly

Plans for the Tri-State Assembly are still indefinite. If the Office of Defense Transportation grants permission, it will be held during the summer. Announcement concerning the final decision will be made through the public press.

Resuscitation of the Infant

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The earliest recognition of resuscitation is a reference in the Bible where Elisha brings back to life the son of a Shunammite woman initiating respirations by breathing into the child's mouth, at the same time maintaining body heat of the boy with his own. The methods of resuscitation of the early ages consisted chiefly of physical or chemical shock which was characterized by violent manipulations of the victims, causing serious damage.

The methods of artificial resuscitation need not be difficult or complicated. Some of the earliest and most simple methods are most effective.

Cessation of respiratory exchange may be caused by paralysis of respiratory muscles as in poliomyelitis, excessive elimination of carbon dioxide, reflex inhibition, as from stimulation of carotid sinus, and by paralysis of the respiratory center as from intracranial lesions, an overdose of sedative drugs such as anesthetics, opiates, barbiturates, or from acute oxygen want. Artificial respiration is applicable in asphyxia neonatorum, aspiration of foreign body, diphtheria, carbon monoxide poisoning, drowning, whooping cough, and electric shock.

In the past it was felt that the newborn lung was a mass of atelectatic tissue.[15] Normally respiration begins in utero, at least during the last half of fetal life. There is a tidal flow of amniotic fluid in and out of the bronchial tree with these movements. The lung instead of being collapsed, contains a certain amount of amniotic fluid and this fluid is essential for the development of respiratory epithelium. As a result of the above, the respiratory tract, and especially the bronchial epithelium is subject to trauma of any foreign substance which may be present in the fluid.

Some of the mucus is prepared by mucous glands in utero and this with amniotic fluid keeps the epithelium of the lungs separated during fetal life. It is stimulated by the presence of bile, meconium, and urine in amniotic fluid. This stimulation may cause a considerable amount of mucus which is found in the newborn and often has necessitated tracheal suction before the baby could breathe. Therefore, asphyxia of the newborn becomes a suppression of a previously existing respiration rather than a failure of a new mechanism to begin its function. Snyder and Rosenfel have confirmed this clinically and experimentally.[15]

There are many causes for the suppression of the already existing respirations: the prenatal condition of the mother, such as an increase in metabolism, any of the metabolic diseases, anemia, hemorrhage, or a disturbance in uterine and placental circulation.

Read at the annual convention of the American Association of Nurse Anesthetists held in Cleveland, Ohio, October 2-5, 1944.

Types of Asphyxia

There are four types of asphyxia. Usually, two are recognized, asphyxia pallida and asphyxia livida; then we have axphyxia due to intracranial hemorrhage and asphyxia, the result of aspiration of mucus.

Asphyxia livida is the result of obstruction to circulation. In asphyxia pallida, the most serious type, the baby shows signs of shock; the muscle tone is lost, heart tones are feeble, and circulation fails. It takes a much longer period for successful resuscitation in this type of asphyxia.

The atmosphere the mother breathes may have an insufficient amount of oxygen, thus causing a deficiency of oxygen to the fetus. The causes for reduction of oxygen in the mother may be: 1. metabolic disturbances, 2. to anesthesia, resulting in obstructed airway, and excessive mucus, which decreases the permeability of the mucous membrane, and 3. there may be aspiration of vomitus. If the mother is showing signs of anoxia, this should be treated before the newborn is delivered; otherwise, there will be evidence of asphyxia in the infant.

Anoxic anoxia may be the result of partial or complete obstruction of the cord. For example, the cord may be around the neck of the baby, there may be knots in the cord or a simple twist, and there may be a prolapse of, or pressure on the cord.

Premedication of the mother may induce a stagnant anoxia, slowing the circulation of the infant and depressing the respiratory center. When opiates are used, they should be timed with the progress of labor so that the baby will be delivered either within the first hour after medication has been administered or four hours after the morphine has been given.

There also may be interference of circulation in an instrumental delivery with too long a compression and injury to cerebral vessels due to sudden compression or release of the head as it passes through the birth canal. Placenta praevia, premature separation or obstruction due to prolonged labor, may be other causes of a deficiency in circulation.

Tetany of the uterus, resulting from the use of pituitrin to initiate contractions, will cause an asphyxiated newborn infant.

Pathological lesions may be a cause of asphyxia. These lesions are: cerebral edema, engorgement of vessels of pia mater, petechial hemorrhage of kidney, heart, and thymus, congestion of liver and spleen.

An infant who has a cerebral injury may have any of the following manifestations: tremor, apathy, convulsions, moaning, bulging fontanel, rigidity, paralysis, weak cry, fleeting cyanosis, and vomiting.

Effect of Anesthetics

Anesthetics have some effect upon the respiratory center of the newborn. Nitrous oxide with adequate oxygen should not cause any respiratory depression, neither should the use of ethylene. Cyclopropane when used for anesthesia, rather than analgesia, will have a depressing effect upon the respiratory center of the baby. It increases the incidence of asphyxia. This has been demonstrated in several instances in our own hospital. In one case, a cesarean section, the obstetrician tied off all oozing vessels as he proceeded and meanwhile the mother had been under cyclopropane anesthesia for over thirty minutes before the baby was delivered. The anesthetist who had to give arti-

ficial resuscitation to this baby, used intratracheal insufflation for twenty minutes before respirations were initiated.

The rate and rhythm of the baby's heart must be watched. If the fetal heart beat decreases thirty or forty beats per minute or falls to a level below one hundred, this is an indication that the fetus lacks oxygen.

To initiate normal respirations after birth, the newborn infant must have a receptive functioning respiratory center integrated with:

1. Respiratory muscles capable of response.
2. An ample supply of oxygen.
3. Clear upper respiratory passages.
4. Distensible lungs.

In the normal child the respiratory center is sufficiently sensitive so that breathing is maintained under the stimulus of the carbon dioxide supplied by the child's own respiratory metabolism. Observations on non-breathing infants show that under prolonged asphyxia the respiratory center undergoes a loss of sensitivity analogous to that known to be induced by morphine, and therefore a much stronger stimulus is required.

The value of carbon dioxide and oxygen depends upon the chemical changes in the circulating blood and fluids within the tissues. Oxygen can stimulate the respiratory center but only in a transient and ineffectual method.[10] Fetal blood has high carbon dioxide tension as is shown in experiments by Kane and Kreiselman. The carbon dioxide content in the blood of a crying baby is 44.9 per cent, in a gasping baby 47.3 per cent, and in an asphyxiated infant 54.6 per cent. But the respiratory threshold is so elevated in a non-breathing newborn infant that a higher percentage of carbon dioxide than is found in air is necessary to overcome this elevated threshold. Therefore, one must remember that the deeper the asphyxia, the greater or higher the concentration of carbon dioxide percentage that will be required.[14]

Henderson feels that carbon dioxide and oxygen should be given routinely as one may deduct from the following statement: "If measures to insure expansion of the lungs were as much a part of the treatment of the newborn—as is now the disinfection of the eyes—lives would be saved as effectively as blindness is now prevented." He also mentions that carbon dioxide and oxygen inhalations should be given to the newborn infants in the nursery the first two or three days following birth to prevent pneumonia and death which may be due to a few atelectatic spots.

Methods of Resuscitation

The methods of resuscitation in the delivery room may vary in each hospital, depending upon the experience and efficiency of the person performing resuscitation, and the equipment available.

The simplest and the easiest method is mouth to mouth breathing. Mouth to mouth resuscitation is accomplished by the forced expirations of the operator inflating the lungs thus causing inspiration, expiration resulting from the elastic recoil of the lungs.

The infant is turned on the back with chin extended so that it points upward toward the ceiling to assure free airway to the larynx. The operator places his lips to the infant's, blowing about sixteen or twenty times per minute, using only the amount of air the mouth can hold so the pressure will not be too great as to rupture the alveoli, or cause further damage.[23] Other advantages of mouth to mouth breathing, in addition to the fact that it is simple and con-

sumes less time, are that almost the correct percentage of carbon dioxide—4 per cent—is administered, correct conditions of temperature and moisture are maintained, and the rate of respiration may be regulated. This method is easily taught to another person who may relieve the operator at any time.

The disadvantages of mouth to mouth resuscitation are:

1. It does not permit accurate control of pressure.
2. There may be over-distention of lungs causing severe damage, such as ruptured alveoli, pneumothorax, and death.
3. There is no rich oxygen mixture.
4. If necessary to provide airway with the finger, mouth to mouth resuscitation is made more difficult.
5. Pathogenic organisms may be transferred from the operator to the infant.[23]

Tracheal suction and insufflation are often times the only means to initiate respirations, hence every anesthetist should acquire skill in doing tracheal intubation. This skill may be attained by practicing on stillborn infants until one feels capable of intubating asphyxiated babies with ease. The equipment necessary is a laryngoscope; a tracheal catheter, the size of which may vary from 10 to 16; usually a size 12 or 14 is used; and a mucus mouth trap. A Murphy drip bulb may be substituted for the mouth trap.

There are two methods for tracheal suction and insufflation: blind and direct.

In the blind method the index finger is passed into the mouth, the epiglottis is drawn forward, and the tip of the finger is allowed to rest on the arytenoid cartilage. The catheter is passed along the index finger and with its tip bent forward it is directed down into the trachea. The trachea is first aspirated for any mucus that is present. The catheter is then withdrawn and emptied of mucus. It is reinserted and air is blown into the lungs. The amount of air to be blown in should be only the amount the mouth can hold; otherwise too great a pressure will be exerted.

The direct method of intubation, which is preferred, is accomplished by the use of the infant size laryngoscope, the epiglottis being lifted and direct vision of the cords attained. The catheter is inserted, and the trachea suctioned. The same procedure is used as in the blind intubation. The advantages of tracheal aspiration and insufflation are:

1. It clears the larynx and pharynx of any obstruction.
2. It usually clears the large bronchioles.
3. It is the most efficient method in that it brings carbon dioxide and oxygen directly to the lungs, and overcomes cohesion of collapsed walls.
4. It puts to work the powerful Hering-Breuer reflex, which arrests over-distention of lungs on inspiration, thus causing exhalation, and prevents too deep an exhalation causing an inspiration.

The disavantages may be: (a) trauma to vocal cords causing an edema of the glottis, (b) rupture of alveoli if too great a pressure is exerted, (c) hemorrhage from surrounding tissues due to improper handling of laryngoscope, and (d) damage to gums and lips.

Mechanical resuscitation is a favorite means of artificial respiration. Resuscitators, as a rule, incorporate some or

all of the following features:

1. Derive their power from the high pressure of compressed gases in tanks attached to the machine.
2. Inflate lungs by blast of oxygen at a certain pressure (usually 14-18 cms. H_2O).
3. Deflate lungs by negative pressure induced by a blast of gas to create suction.
4. Suction devices for removal of secretions if necessary.
5. Inhalators to allow patients with restored respiration to inhale pure oxygen or oxygen and carbon dioxide mixture without mechanical aid.
6. Regulator to control tidal volume of the machine to that of the patient.
7. Automatic shut-off when the calibrated pressure is attained.
8. Automatic institution of negative pressure when the insufflator is shut off.
9. A fixed valve for adjusting the rate of respiration.

Mechanical resuscitation, however, is only as effective as the experience and efficiency of the person operating the resuscitator.

The only time that it is felt necessary, in our hospital, to give analeptics to stimulate respiration is when one finds the heart rate of the newborn infant decreasing. Recommended drugs are metrazol, coramine, or alpha lobeline, with oxygen under pressure; the dosage corresponding to the age and condition of the infant. It is essential that the patient have adequate oxygen to obtain the maximum effect of the stimulating drugs.

In the pallid type of asphyxia, if it is due to hemorrhage, it is wise to give the newborn infant blood immediately.

Frequently the department of anesthesia is called to the nursery to resuscitate an infant. Among the common causes found, from the history, are: 1. the baby regurgitated milk or formula, and 2. in lavaging, the tube may have entered the trachea instead of the esophagus, thereby partially or completely filling the respiratory chambers. When the foreign substance has been removed, intratracheal insufflation must be instituted until the baby has started to breathe by itself, or until complete respiratory interchange of air mixture has been restored to normal limits. This may be accomplished by adjusting the resuscitator consistent with the vital capacity of the respiratory chambers or with a bag and mask. Consideration should be given to the size, weight, muscular tone, and circulatory condition of the baby. The use of oxygen 95 per cent and carbon dioxide 5 per cent, or various percentages of carbon dioxide depends upon the general condition of the baby, the obstructing media, or to congenital anomalies of the air passages.

Equipment in the nursery for resuscitation at any time is as important as for the delivery room. Equipment should be sufficient for pharyngeal, tracheal, and pulmonary aspiration. It is imperative that all personnel in the nursery be trained to know and use the simple methods of resuscitation until the anesthetist arrives. It is important that changing personnel know the technical use and mechanics of the machine so that they can make quick repairs. If no equipment is available the simple methods of resuscitation should be done.

Contagious Diseases

Contagious diseases such as poliomyelitis may result in a paralysis of the muscles of respiration. Poliomyelitis

can prevent efficient respiration in three ways.

1. Actual paralysis of primary respiratory muscles, the intercostals and the diaphragm due to damage to cells, the anterior horn, or motor nerve roots.
2. Disturbances of the nerve centers in the medulla which presumably control the rate, rhythm, and depth of respiration.
3. Collection of mucus or vomitus around the glottis in a patient with paralysis of the pharynx, causing constantly interrupted inspiratory efforts resulting in shallow, irregular, ineffective respirations.

Respirations may be attained by positive pressure with a bag and a mask until a respirator arrives. This is the type of case in which the respirator is indicated. The important factor to remember is that the negative pressure should not be too great for the child. The apparatus encases the whole body with the exception of the head. The air is exhausted from the chamber, causing a partial vacuum or negative pressure causing the chest to expand, allowing the air from the outside to enter the infant's lungs. When a certain point is reached the vacuum is automatically released, and elastic recoil of the chest wall causes expiration. The negative pressure for infants should not exceed vital capacity of the chest. The respiratory rate should be regulated to between twenty to thirty per minute.

It is essential to avoid delay in using the respirator, and the infant should be removed from respirator as early as possible. The baby should be taken out for a few minutes daily, and the time the baby is allowed out should be increased each day until it no longer needs the assistance of the respirator.

The advantages of the respirators are:

1. Inspirations are as normal as can be produced by a mechanical device.
2. Expiration is produced by elastic recoil of the lung, which is a normal phenomenon.

Whooping cough is one of the contagious diseases which may cause asphyxia due to respiratory obstruction from a mucus plug, or edema of the larynx due to irritation from paroxysmal coughing, causing a narrowing of the glottis. Intratracheal intubation with suction is of great value and oxygen may be administered by a bag and mask with positive pressure with the use of a manometer. This may be done as quickly as a tracheotomy if the anesthetist is skilled in intubation.

In diphtheria the larynx may be involved, usually called laryngeal diphtheria. The larynx may be covered with a thick membrane causing difficulty on inspiration, but the most difficulty is usually found on exhalation, thus causing an inefficient exchange of gases, carbon dioxide and oxygen. If dyspnea continues, an intubation should be done. If this is not successful, a tracheotomy is then required.

Respiratory paralysis occurs in severe cases and is usually due to involvement of the phrenic and nasopharyngeal nerves. If artificial respiration is not instituted, the patient may die within eight to ten days. These patients are placed in the respirator tilted for postural drainage to a minus twenty degrees angle. Tracheal suction may be necessary to remove the tenacious mucus.

Drowning

One of the most pathetic accidents to be brought into the emergency room is drowning. People usually are of the

opinion that if a person has been immersed longer than four or five minutes, resuscitation is of no avail. It there are no signs of respiration or pulse, they regard the person as dead; and if one does attempt artificial respiration, one half to one hour is considered long enough. To show that the above is not correct, I wish to state the case of a baby who fell into some wash water and remained immersed for twenty-five minutes. Artificial respiration was begun and kept up for four hours; the child recovered.

In drowning there is a spasm of the vocal cords which causes an obstruction to the respiratory passage, followed by death. The tracheobronchial tree and lungs must be as free of foreign material as possible. It is absolutely useless to introduce a sufficient amount of gas into the tracheo-pulmonary system if the absorbing area is blocked by excessive fluid in the pulmonary chambers. Carbon dioxide 5 per cent and oxygen 95 per cent should be administered. At one time it was thought that carbon dioxide accumulated in the blood, but experiments have proved there is an initial rise, then a fall below the normal level.

Heart muscle does not die quickly after drowning. It is important to encourage venous return to the heart, which is accomplished wtih the head in the down position, ten degrees Trendelenburg. To fill an empty heart is a quick way to start it beating. In resuscitation we must bear in mind that it is the nerve cells of respiration and of the spinal center that we must revive with warm circulating oxygenated blood from the lungs. Nerve cells become paralyzed with cooling but will revive with warmth. It has been suggested that a hot water bottle be placed to the back of the neck to improve circulation to the brain.

The muscles react to stimulation of either moderate cold or moderate heat applications. Thus it is essential that the chest be kept warm. Any heat loss due to evaporation and cold winds should be prevented by the application of hot water bottles and blankets, short wave diathermy, and impervious material.

The Schaefer prone method of resuscitation is the most widely recommended and approved without equipment. The amount of tidal air, depending on the skill of the operator, may be as great as 520 cc., the amount of air being dependent upon the size of the patient and upon muscle tonus, which is influenced by blood gases in the respiratory center.

The Sylvester method is not an efficient means of resuscitation following drowning, as the position of the patient does not allow for elimination of foreign material from the respiratory tract; also the amount of tidal air is approximately 175 cc. It is advised that artificial resuscitation in a drowned person be continued until rigor mortis has set in.

In carbon monoxide poisoning, anoxia is not as complete as in drowning or electric shock. There is a characteristic flushing of the skin instead of cyanosis. In this type of asphyxia manual artificial resuscitation is not indicated; carbon dioxide and oxygen must be given immediately so as to stimulate existing breathing and increase the volume of respiration. Carbon dioxide from 5 per cent to 7 per cent and oxygen 95 to 93 per cent promote the dissociation of carbon monoxide from the hemoglobin. It is important to remember that no rebreathing should be allowed.

Frequently one sees an infant in the

accident room who has aspirated a foreign body which should be removed as quickly as possible. If removal is delayed, oxygen, or helium and oxygen mixture should be administered under moderate pressure to force the oxygen past the obstruction, being careful not to force it further into the tracheobronchial tree, while preparations are being made for a tracheotomy or bronchoscopic removal of the foreign body.

It is not unusual for an infant to be admitted to the hospital who has swallowed an unknown quantity of a barbiturate. One should carefully note the signs: shallow respiration, fixed eyeballs with contracted pupils, or paralytically dilated pupils if a lethal dose has been taken. The restorative measures consist of gastric lavage, a harsh cathartic, and intravenous administration of picrotoxin or metrazol. Metrazol is advocated because of its direct stimulating action on the respiratory center. Five cubic centimeters intravenously is considered the adult dose; therefore, applying "Young's Rule," for a child of three years, 1½ cc. of metrazol should be given inravenously. After two minutes, if there are no signs of convulsions, and additional ½ cc. should be given every two to five minutes until recovery. In the meantime a clear airway should be maintained and oxygen, under pressure if necessary, should be given continuously.

In the operating room we are often called upon to give artificial resuscitation due to many causes: overdosage of the anesthetic, sudden stopping of the heart, or suffocation due to enlarged thymus. It is well understood that the safety of anesthesia depends upon the early recognition of danger signals and institution of preventive measures.

Anesthetics for Infants

Ether is generally felt to be the safest anesthetic for infants. It is well to note that the amount of ether necessary to cause cardiac arrest, is one-half again the amount which causes respiratory arrest. Vinethene is safe in capable and experienced hands; the respirations, however, are the only reliable sign of anesthesia. Vinethene is eliminated rapidly from the lungs. After several years of experience with this drug I have never seen a case of respiratory arrest.

Ethyl chloride is safe for analgesia if administered by experienced anesthetists. It is necessary that the anesthetist know that the patient will tend to go into deeper anesthesia after it is discontinued as a result of absorption of the drug from the dead spaces. Dr. Ralph Knight of the University of Minnesota, Minneapolis, Minnesota, and Dr. John Adriani of Charity Hospital, New Orleans, Louisiana, strongly condemn the administration of ethyl chloride by spraying on the mask, recommending that the drop method be used. When the drug is sprayed on the mask, it freezes more readily on the gauze, thus allowing less air to the patient and increasing the concentration of the anesthetic mixture. In one anesthesia department where the anesthetist sprayed ethyl chloride on the mask, two fatalities almost occurred.

Cyclopropane has its advantage for infants due to the fact that the oxygen content is high, but because of its rapidity of action and depressing effect on the respiratory center it must be given with care. If respiratory arrest does occur, the bag should be emptied immediately and oxygen given under pressure. It is advisable to use a manometer in order to prevent too great an amount

of pressure, and thus cause damage to the alveoli. Occasionally intratracheal intubation is necessary because of spasm of the vocal cords.

Sudden stopping of the heart may be due to vagal inhibition. Atropine is sometimes given the infant to prevent an increase in mucus. This drug paralyzes the vagus nerve, thus allowing the sympathetic nerves to have full control of the heart, causing an increased rate. If the child is frightened, adrenalin is spilled into the system and if the myocardium is abnormally irritable, ventricular fibrillation may result. It is important to get oxygen into the heart immediately. If the heart action stops an attempt should be made to stimulate it by mechanical means. Cardiac massage should be instituted immediately. This must be done rhythmically and without exerting too much pressure.

There is much controversy regarding an enlarged thymus gland and its relation to death on the operating table. Any infant who has respiratory embarrassment following a moderate cold, under moderate living conditions, should not under any circumstances have an anesthetic until examination has been made by a radiologist for enlargement of the thymus gland. It is recommended that any anesthetic that will cause an increase in mucus should not be administered. Dr. George J. Thomas of Pittsburgh, Pennsylvania, in a letter relative to the death of a child thus observes: "I have seen several instances where these glands were stimulated to the extent that the mucus ran out of the mouth as if coming from a water spigot. These patients were placed in fifteen degree Trendelenburg position and aspirated. Oxygen was administered in high concentration and hypertonic sucrose solution given intravenously. Needless to say that such treatment must be instituted without delay and just as soon as the condition is recognized."[33]

Respiratory stimulants may be given, but they are not as essential as oxygen. Adequate oxygen must be carried to the brain continuously; otherwise, rapid degeneration of the brain cells will occur. To obtain the maximum effect of any respiratory stimulant oxygen must be administered.

The question arises as to who should be responsible for the resuscitation equipment. Because there is a close correlation between resuscitation and anesthesia, it would seem to be a wise arrangement that members or a member of the anesthesia department be held responsible. This person should check the equipment each day to see that no empty tanks are left on the machines, that the laryngoscopes are in good working order, that batteries and bulbs are checked, and that catheters and suction apparatus are cleaned thoroughly. Also, this person should be responsible for the purchase or ordering of new equipment. She would also teach internes, student anesthetists, and student nurses the art of resuscitation.

In conclusion, the purpose of resuscitation is to supply oxygen to the body while the body still retains some of its tone and the heart is still beating. The following requirements are essential in order to obtain successful resuscitation:

1. Removal of foreign material from upper pharynx. If suction is not available Schaefer prone method should be used.
2. Establishment of a patent airway.
3. Securing intermittent inflation of the lungs with air or oxygen.
4. Removal of all clothing from chest

and neck.

5. Observing the patient's ability to effect the exchange of gases in the lungs.
6. Keeping the patient warm.
7. Massaging the body muscles to stimulate circulation.
8. Determining the relative tension of oxygen and carbon dioxide in tissues and blood.
9. Making sure that oxygen is being carried to the tissues and that carbon dioxide is being thrown off from the tissues by means of the cardiovascular system.

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Anesthesia in Oral Surgery

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I AM probably not the only speaker on this program to remind you that this year is the one hundredth anniversary of the use of nitrous oxide as an anesthetic, and that the demonstration was made by a dentist, Dr. Horace Wells. But I mention it again, and stress the importance of regarding modern practices in their historical framework and background, for only in this way can we realize the tremendous advances that have been made and the significance of the contributions wrought by experimentation, courage and hard work, as well as creative thought, on the part of many individuals, to evolve the current routine practices that we take more or less for granted. The great advancement of the science of exodontia and oral surgery during the past twenty-five years can be attributed largely to modern perfection of anesthesia, and particularly of gas anesthesia.

While general anesthesia in oral surgery is based on the same general principles and adheres to the same fundamental laws as in other types of surgical work, it presents some special problems —some of them advantages and others disadvantages—peculiar to this type of operation. This necessitates some deviation from the practices followed for operations in a hospital, for the majority of oral operations are performed in the office, and these special applications may be of interest to you.

I shall not enter into any discussion as to the relative merits of local and general anesthesia, since both have their own very definite indications and uses. For routine dental surgery, as done by a general practitioner, local anesthesia is used preponderantly, but the specialist in oral surgery uses general anesthesia in the majority of operations, since most of his patients represent more serious cases referred from dentists or physicians or patients who demand general anesthesia which the average practitioner is not prepared to administer. Hence I shall confine my discussion to general anesthesia in oral surgery, but I want to make it clear that I am not recommending the indiscriminate use of this type of anesthesia in all dental and oral operations. It should never be administered except by one who has had adequate training in general anesthesia and wide experience in its use.

Although most of us who specialize in the practice of oral surgery have worked out our own methods of administering anesthetics, it is interesting to note, on reviewing the literature of the past ten years on the subject, that authorities in this field are generally in agreement on essential points, and that the technic of administration of anesthesia for oral operations is fairly well standardized.

We all subscribe to the idea that it would be theoretically desirable for patients to undergo a thorough physical examination before being subjected to

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Read at the annual convention of the American Association of Nurse Anesthetists held in Cleveland, Ohio, October 2-5, 1944.

nitrous oxide-oxygen anesthesia, but in practice this is impossible and wholly impracticable. The results indicate that, when properly administered by an experienced operator, this type of anesthesia is safe because oral operations are usually of short duration, anesthesia usually is light and the patients ordinarily are in fairly good health. It is a common dictum that if the patient can walk to the oral surgeon's office unaided, he may be considered a good risk for nitrous oxide anesthesia. In general, the psychic trauma inflicted on the patient, who is usually somewhat apprehensive anyway, by a thorough physical examination and exhausting tests prior to administering an anesthetic for oral operations, constitutes a greater risk and handicap that more than offset the theoretical danger—so slight as to be almost non-existent—of omitting this procedure. When a patient is to have a surgical operation on some other part of his body, he is resigned to hospital care and all the procedures that accompany it, but when he is to have a tooth removed in a dental chair, he fails to see the necessity for detailed physical examination and will not submit to it, unless he knows of some definite indication for it. Any attempt to insist on this only serves to frighten and irritate the average patient.

Nevertheless, the oral surgeon learns, by observing the patient carefully, to recognize certain signs that indicate the need for general examination before the administration of the anesthetic. Gross has listed these as follows: (1) bulging eyes (hyperthyroidism), (2) puffiness around the eyes (nephritis), (3) yellow conjunctiva (jaundice and bleeding), (4) blue nails and lips (circulatory disease), (5) clubbed fingers and cyanotic face (cardiac and pulmonary disease), (6) hard and tortuous temporal arteries (arteriosclerosis), (7) wheezing (asthma and allergy to drugs). The patient should be questioned about dyspnea, edema of the ankles, pain about the heart, chronic headaches or any recent serious illness. If there is any doubt about the individual's fitness for anesthesia, a medical consultation should be insisted upon.

All authorities are agreed that nitrous oxide and oxygen is the anesthetic agent of choice for oral operations. When administered properly, it can be given with greater safety and speed and less postoperative discomfort than any other. Nitrous oxide, as you know, is soluble in the circulating fluids of the body and has no destructive side action. The lipoid solvents, such as ether and chloroform, drive out oxygen by accumulating in the nuclei, where they remain long after, and these drugs should never be used outside a hospital. Although ethylene possesses slightly greater anesthetic effect than nitrous oxide, its use is contraindicated because its lipoid solubility prevents its prompt elimination, and it is highly explosive, making it entirely unsuitable for office use.

Careful instructions should be given to the patient who is to undergo anesthesia, to prevent discomfort and nausea during or after the operation. The patient should be in a fasting state, but withholding of food should not be carried to extremes. If the operation is to be done in the morning, the patient is told to eat a hearty meal the night before and to take no breakfast. The person to be operated on in the afternoon should eat a light breakfast, such as tea and toast or orange juice. Hildebrand has pointed out that nausea and vomiting never occurs when anesthesia is kept in the surgical plane. In 80 per

cent of the instances of nausea and vomiting, too much anesthetic has been administered for too long a time. Occasionally, vomiting occurs in the light surgical plane, and can be caused by carrying the patient from light to deep anesthesia too suddenly. Swallowing of blood during the operation also may cause vomiting. Before a patient actually vomits, there is a tendency to swallow which can be felt by the anesthetist's fingers supporting the chin. This is a sign that anesthesia is too deep, and if it is not lightened immediately, retching will follow. This is counteracted by administration of oxygen.

Premedication

Premedication is recommended by most oral surgeons, especially in patients who are likely to be resistant to induction of anesthesia. Alcoholics, patients of plethoric and neurotic type, those with hyperactive thyroids, excessive smokers and those of the muscular, athletic type are likely to prove difficult to anesthetize, and the procedure is made easier if the patient receives some sedative medication about a half hour before operation. I use nembutal (pentobarbital sodium), the drug that is most widely employed. The dose is 1.5 to 3 grains by mouth a half hour before induction. Since patients exhibit wide variation in their response to sedatives, depending on their metabolic rate, it is wise to administer these drugs cautiously. Unless the patient is obviously of the hyperirritable type, it is well to administer a dose of 1.5 grains of nembutal at first, and to observe the reaction to it. If, after fifteen minutes, the response is inadequate, then the dose may be repeated. It is well also to question the patient about his or her reactions to sedative medication, before giving the drug.

Depending on personal preference, some surgeons use morphine (1/8 to 1/6 grain hypodermically), sodium amytal (3 grains), chloretone (10 grains), pyramidon (3 to 5 grains), luminal (5 grains), and numerous other drugs. While morphine is more effective than nembutal and is the ideal synergist and excellent for prevention of shock, its use in office practice generally is contraindicated because of the need for prolonged postoperative care.

The greatest difficulty and disadvantage in administering a general anesthetic for oral operations is that the mouth must be kept open, and yet mount breathing must be prevented to avoid dilution of anesthetic gases by inspired air. This is accomplished with a nasopharyngeal pack. It is not our custom to apply restraining appliances before the anesthetic is started, as the sight of them constitutes another psychologic hazard for the lightly or nonpremedicated patient. Since leather straps have a tendency to bruise the skin, we use towels (18 in. x 10 ft.) which are draped over the patient after the induction and are tied to the back of the chair. These are removed after anesthesia has passed.

The technic of induction of nitrous oxide-oxygen anesthesia, as followed essentially by all oral surgeons, has been well described by Hildebrand, who stresses the following points: Before operation, the patient's bladder and lower bowel should be evacuated. All tight clothing about the neck, chest and abdomen are loosened or removed to eliminate any possible interference with respiration. The patient is then comfortably seated in the chair, which should be tilted back to prevent him from sliding forward after he is asleep.

The headrest is adjusted and locked, so that no unexpected movement of the patient will change its position. Headrest pads are placed behind and under the occiput and mastoid eminences, so that with the mouth open, the head and neck are in line with the chest. All removable bridges should be removed before the mouth prop is inserted. The prop is inserted into the mouth before the nasal hood is placed in position to make sure that the patient can breathe freely. If the prop forces the mouth too widely open there may be constriction of the airway by forcing soft parts of the floor of the mouth backwards, principally in patients with short mandibles. Patients with retruding mandibles are a special source of trouble when the operation is to be performed on the lower jaw. Any slight pressure forces the mandible backward and mechanically interferes with respiration. The nasal inhaler is then adjusted so that it is airtight, and while this is being done, the patient is reassured with a few comforting remarks.

Normally the alae should be open during inspiration, but in some patients they are drawn in or the nostrils are too small for easy respiration; hence the pressure of gas must be considered as an aid to breathing. There should be sufficient pressure to promote easy inspiration, especially while the patient is conscious and fears he may not be able to inhale. Pressure of 3 to 5 mm. of mercury usually is sufficient, unless there is considerable constriction of the nares due to presence of spurs, deviated septum, polyps or adenoids.

Fast induction of anesthesia is the method of choice for oral surgery and will eliminate most troublesome complications. Administration is begun with 100 per cent nitrous oxide until the first signs of anoxemia appear, such as twitching of the upper eyelids, pharyngeal stertor, or clonic or tonic movements of the involuntary muscles. As these signs present themselves, oxygen should be added to the mixture to carry the patient into normal surgical anesthesia. Although there is no known mixture of nitrous oxide and oxygen that is ideal for all cases, the average mixture is 93 per cent nitrous oxide and 7 per cent oxygen. This mixture should be regarded as temporary and the patient's reaction to it should be observed for a few seconds. If anesthesia is too light, a few inhalations of 100 per cent nitrous oxide are given and the mixture carried to 94 per cent nitrous oxide and 6 per cent oxygen. On the other hand, if the first mixture anesthetizes the patient too deeply, a breath of 25 per cent oxygen is administered and the nitrous oxide level is reduced to 92 per cent. Percentage of increase or decrease in the mixture thereafter depends on signs exhibited by the patient. After the level of anesthesia has been determined, sufficient time is allowed for establishment of proper anesthetic tension, for there is no anesthesia until a definite tension is established in the tissue cells. A little time spent on stabilization of anesthesia at the beginning of the operation saves interruption and annoyance during the later stages of the procedure. The period of induction is the most important, so far as administration of the anesthetic is concerned. Once the proper level of anesthesia has been attained, it is simple to maintain the patient for as long as necessary by addition of small amounts of oxygen, as indicated.

When the desired plane of anesthesia has been reached, the throat pack is inserted. This is one of the most important features of the technic in oral op-

erations. Careless insertion of the throat pack is a great factor in production of asphyxia, ranging from a mild degree of anoxemia to respiratory paralysis. The pack serves as a barrier against inspiration of foreign material, mucus, saliva, blood, and foreign bodies. The pack also aids in efficient control of the maintenance period of anesthesia in preventing inhalation of air through the mouth, thus diluting and disturbing the balance of the desirable anesthetic mixture. It also restricts escape of gases through the mouth.

The size of the throat pack is important; if it is too large, it will obstruct the field of operation, and if it is too small, it will have a tendency to slip into the throat and close the airway. The largest size that can be conveniently and effectively used is preferred. The material of which the pack is made should be dense enough to exclude most of the air breathed into the mouth, but porous enough to absorb a maximum of blood and mucus. I use a pack consisting of eight to ten thicknesses of gauze, 4 inches wide and about a foot long. Cotton is used by some operators, but it tends to disintegrate in the mouth, bits of it stick to fingers and instruments, and small particles may be easily aspirated by the patient. When the gauze pack is used, enough can be introduced to fill a mouth of any size, and it is impossible for the patient to aspirate or swallow it. When the gauze in the mouth becomes saturated with blood or saliva, some of the slack, which is hanging out of the corner of the mouth may be introduced. This makes it unnecessary to remove the old pack and to introduce a fresh one, which must be done when merely a string is used. The tail of the pack makes a convenient sponge for clearing the operative field.

At the time of inserting the pack, the mouth should be propped open widely enough to permit easy and correct placement. The pack must not be placed too far forward or too far back in the mouth; if placed forward it will be ineffective, and if placed too far back it will obstruct the airway. At the time of inserting the pack, the tongue is pulled forward by hooking the index and middle fingers behind its base to prevent pushing the tongue back into the throat. The tip of the tongue should be visible after the pack is in position. The slack end hangs out of the mouth, and furnishes a means of removing the pack quickly if the necessity for this should arise.

The signs of anesthesia, as you know them, are the same in the oral surgeon's office as in the hospital, as well as the signs of respiratory difficulty and other complications that may arise. Hence this is not the place for a discussion of these problems. One point, however, should be mentioned, for it is one that has caused confusion in the minds of many who administer anesthetics for dental operations, and has led to unsatisfactory and inadequate anesthesia in many instances. I refer to misinformation regarding the significance of cyanosis. Presence of cyanosis indicates that there is not enough oxygen intake to convert all the hemoglobin in the circulating blood into oxyhemoglobin. This is *not* the same as anoxemia, which implies an intake of oxygen insufficient to maintain vital functions of the heart, lungs and tissues, an intake below the oxygen threshold for the individual.

Type of Patient

Here the type of individual patient must be considered. The anemic pa-

tient, whose hemoglobin index is low, gets sufficient oxygen to saturate the hemoglobin, and the color will remain pink throughout the period of narcosis. This same patient, whose color supposedly is very good, could experience respiratory failure without any change of color. The plethoric type of individual has super-abundant hemoglobin, and it is usually impossible to saturate his hemoglobin with oxygen and still maintain a state of surgical anesthesia. Such a patient may exhibit cyanosis before the surgical stage of anesthesia is reached and still be far from suffering real anoxemia. It is fallacious to accept cyanosis as an indication of definite depth of anesthesia or as a manifestation of circulatory depression. When cyanosis is present to any degree, however, it becomes important to check the level of anesthesia by other signs, and then to decide whether the patient is in danger of circulatory or respiratory depression.

In oral surgery, the danger of respiratory collapse from obstruction of the airway is much greater than that of an overdose of anesthetic gases. Administration of oxygen is of no avail if the passage leading from the nasopharynx to the pulmonary capillaries is obstructed. Relatively slight interference with the air passages by depressing the mandible, by backward movement of the tongue, by pushing mouthpacks in too far, or by entrance of blood or clots into the pharynx may diminish the exchange of gases in the lungs sufficiently to cause asphyxia of varying degrees. Use of a nasopharyngeal tube with a flanged end that fits over the nares and does not interfere with placement of the nasal hood insures patency of the airway, and is of great help to the anesthetist. This tube is lubricated and placed in position after induction of anesthesia and removed before recovery.

The tongue falling backward in the oropharynx is one of the most common sources of interference with breathing during an intraoral operation. If this should occur, the tongue is pulled forward at its base with the second and third fingers. Tongue forceps are useless, for they tend to stretch the anterior portion of the tongue without affecting the base, where the difficulty lies.

In the majority of operations performed by the oral surgeon in his office, administration of nitrous oxide and oxygen by rapid induction and under pressure, after premedication with nembutal, produces satisfactory anesthesia. There are some notably resistant patients, however, when some adjunct is necessary. Ether, for obvious reasons, is definitely contraindicated for office use, but vinethene can be used safely. It is far better to use this agent by the closed method, with adequate oxygen, than to saturate the patient to the cyanotic, or possibly anoxemic state with excessive amounts of nitrous oxide. Vinethene acts quickly and is rapidly excreted, with little or no after-effects. It must be handled cautiously, however, for it is inflammable and may be dangerous in inexperienced hands.

Pentothal sodium in a 2.5 per cent solution, administered intravenously, has been used by some oral surgeons in office practice, but in view of the dangers attendant on intravenous medication generally, and on the special effects of pentothal sodium, I believe it should be used only in exceptional cases. For maximal safety, intravenous anesthetic agents should be administered only in the hospital. As Arrowood has

pointed out, the vagus is not sufficiently depressed during anesthesia with the intravenous barbiturates to cause disappearance of pharyngeal reflexes. Superficially, it would appear that this is an advantage, but actually it has been demonstrated that manipulations about the airway or irritation of the larynx by saliva or foreign material may result in spastic closure of the glottis with extreme cyanosis. Adequate premedication with atropine helps to protect against this type of accident. If such an accident occurs, tracheal intubation should be promptly resorted to for administration of adequate oxygen.

Major oral surgery, performed in the hospital, presents no special problems, so far as anesthesia is concerned. The patient is hospitalized and preoperative preparation and premedication are similar to that carried out before any other major surgical procedure. The technical problem in the administration of anesthetics for these operations is to provide narcosis of sufficient depth and duration, while protecting the patient from respiratory obstruction and aspiration of any foreign material.

Question of Rapid Induction

No doubt, in view of your training and experience in administering anesthetics for major operations in the hospital, there may be some question in your minds about the rapid induction of anesthesia as we use it in the office practice of oral surgery. Indeed this is a justifiable question, and one that has received much attention from those of us who do this type of work. Actually, there is still some difference of opinion about it, and a few still insist on slow induction. Nevertheless, the vast majority of oral surgeons, in the light of individual and collective experience, favor the rapid induction method. Although Arrowood states that 100 per cent nitrous oxide should never be administered to any human being at any time, anywhere, this has actually been refuted by practical experience in hundreds of thousands of cases, in which nitrous oxide anesthesia has been given safely by rapid induction by highly trained oral surgeons or their anesthetists. Many surgeons have performed 40,000 or 50,000 such operations without a single death. It must be remembered that patients subjected to dental surgery are in relatively good health, compared to hospital patients, and hence a procedure that is safe for them could not be applied safely in hospital cases. It must also be remembered that psychologic factors are as important, if not more so, than physiologic considerations, in office practice. Only light premedication can be given to the ambulatory patient, and the induction must be more rapid to avoid reactions and insure rapid recovery, for the patient must be able to return to his home within a short time after the operation. The patient in the hospital is prepared both psychologically and physically for incapacitation and more or less prolonged illness, and remains under observation and care after the operation is completed.

As Hildebrand has emphasized, when a patient has to lose consciousness (and he dreads that more than the thought of the operative procedure) he wants this brought about as rapidly as possible. When 100 per cent nitrous oxide is administered at the beginning, the patient experiences no unpleasant sensations or dreams, because the subconscious mind has no time to act before unconsciousness ensues. Likewise by fast induction, the second or excite-

ment stage of anesthesia passes rapidly without any reaction and consequently the patient's energy and physical resources are not depleted by undue muscular activity, increased heart action or rise in blood pressure.

Another feature of the administration of anesthetics in oral operations that has been questioned is the use of positive pressure, but these objections are not borne out by clinical facts. It is essential, of course, that the pressure be accurately known and controlled, by a simple positive pressure valve. The blood will absorb 45 volumes of nitrous oxide to 100 volumes of blood at atmospheric pressure. A more profound anesthesia will result when nitrous oxide-oxygen is administered under pressure. Any desired pressure must be constantly at the control of the anesthetist, for especially in operations on the open mouth it is essential to administer the correct mixture under positive pressure to avoid dilution from the surrounding air. When there is considerable constriction of the nares, pressure is an important and desirable feature and will aid in promoting a more normal and less difficult inspiratory phase resulting in more rapid absorption of the anesthetic gases and a smoother narcosis. During the induction period, 3 to 5 mm. of mercury is sufficient in the average case; after the desired plane of anesthesia has been reached, an additional pressure of 5 mm. of mercury or even more may be added. The patient who is difficult to anesthetize may require 20 mm. or more. Pressure is of great aid in keeping tissues about the pharynx ballooned or slightly distended, making a space for breathing, and also to keep the mouth pack away from the posterior pharyngeal wall. It becomes of tremendous importance in emergency administration of oxygen in case of respiratory difficulty.

The solution to the problem of anesthesia in oral surgery, as in any other type of surgery, lies in sound and expert training of the individual for this very important task. It has been said that it takes about five years to make a good anesthetist, and this probably is no exaggeration, particularly in acquiring a satisfactory technic in administration of prolonged nitrous oxide-oxygen anesthesia.

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The Bulletin—Now—The Journal

Doubtless, you were surprised to receive our official publication under its new name. There has been an increasing expression of opinion, within the past few years, that the name BULLETIN does not fit the publication. A *bulletin,* as the word is generally used, is a brief publication, published at irregular intervals, whereas, a *journal* is a periodical publication, giving an account of passing events, the proceedings and memoirs of societies; a magazine.

If the change in name had been submitted to the vote of the members, action would have been postponed until the convention in October. Since there is question as to whether the convention will be held, the Board of Trustees voted to change the name, commencing with the May, 1945 issue. Hence our official publication will, hereafter, be THE JOURNAL of the American Association of Nurse anesthetists.

—Edith Helen Holmes,
Chairman Committee on Publications.

Word from Overseas

Lt. (j.g.) Sarah Rausch writes from an overseas Refugee Camp where she is operating room supervisor and anesthetist, averaging fifteen operations a week and using open ether, chloroform, pentothal and ethyl chloride.

She reports that her trip over was enjoyable, allowing some time in London and Cairo. Her work permits excursions into the country in which she is stationed. Life at the camp is very primitive. Lt. Rausch has three foreign nurses under her and is, of course, finding the difference in language an obstacle in teaching techniques.

COMMITTEE ON PUBLICATIONS

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Ban On Meetings Cancels Conventions Scheduled Up to July 1

Washington, D. C.—So far as is known, none of the hospital conventions scheduled for the period from February 1 to July 1 will be held. Notices of cancellation have been received from the Southeastern Hospital Conference, Texas Hospital Association, New England Hospital Assembly, Ohio Hospital Association, Tennessee Hospital Association and Midwest Hospital Association. Most other state and regional associations are in doubt whether their conventions can be held.

The American Hospital Association is proceeding with plans for holding its annual meeting in Philadelphia October 1 to 5 and will not make a final decision until June. No application has been made as yet for federal approval. The Catholic Hospital Association is doing the same as regards its convention in Milwaukee on August 27 to 31.

Between February 1 and 9 the War Committee on Conventions denied 469 applications for approval of scheduled meetings and approved 15. Unless the transportation situation changes markedly there will be few hospital conventions this year.

—From "Modern Hospital," March 1945.

Anesthesia In Ophthalmology

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THERE IS very little original material in this discussion of anesthesia in ophthalmology, and little that is new in regard to the choice of the anesthetic in ophthalmology. However, there are a few proved factors. By clinical trial alone most anesthetic drugs are accepted or discarded. Mention will be made of routine anesthetics, used by our group, which have been accepted by the process of elimination.

Anesthesia in surgery dates from 1846, a little less than one hundred years ago.[1] The ancients, we are taught, employed no anesthesia of any value in ophthalmology except force. Later, beverages containing alcohol, and drinks with narcotic properties were instituted, along with inhalations of narcotic drugs administered in the form of "sleep sponges." Still later, suggestion, hypnotism and pressure on the different nerve trunks were used. Cold was first used by Bartholimus in the sixteenth century in the form of ice or ice and salt. Then followed ether spray along with other rapidly evaporating fluids to induce anesthesia. In minor surgery ethyl chloride or bromide and carbon dioxide are still used to freeze tissue to produce superficial local anesthesia. It was observed early that injection of sleep-producing drugs had no effect upon a local operative field.

Alexander Scott, Edinburgh, Scotland, in 1853 first developed the hollow needle for hypodermic injections which made possible the present methods of local anesthesia. In 1884, Koller introduced cocaine to surgery, although cocaine had been discovered by Goedcke in 1855, and used previously by Scherzer, Wohler and Nieman.[2-3] In 1879, Von Aurep noted the mydriatic action of cocaine when it was instilled into the conjunctival sac.[4] Bull was the first American surgeon to use cocaine (October 8, 1884).[5] Cocaine administered locally by instillation into the conjunctival sac is the anesthetic of choice for intraocular surgery by most ophthalmic surgeons in this locality today.

No mention will be made of the physical properties of the various drugs in use in ordinary ophthalmic practice. A word of caution must be given, however, in regard to the drugs employed both in local and in general anesthesia. Physicians, nurses and other students of anesthesiology appreciate that the physical condition of the patient, the operation to be performed, plus clinical experience must be our guide in the choice of the anesthetic. One surgeon relies upon one set of drugs and another surgeon upon a different set, but the end-results are about the same.

Let us, in this discussion, divide

Read at the Tri-State Nurse Anesthetist Assembly held in Chicago May 10-12, 1944, by Leone Myers, Anesthetist, Pember-Nazum Clinic.

anesthesia into the classical divisions of local or general anesthesia, or a combination of the two with or without the use of supportive drugs. General anesthesia may be subdivided into inhalation, intravenous and rectal.

Drugs employed (again reference is made only to those adequate in our own group) include codein ¼-2 grain, luminal or phenobarbital 1½-3 grains, nembutal or pentobarbital sodium 1½ grains with or without acetyl salicylic acid; seconal 1½ grain; allonal 2⅔ grains, dilaudid 1/32 grain subcutaneously or 1/24 grain orally, morphine and scopolamine with or without atropine. Lately, demerol has been advocated in place of morphine.[6] Demerol was discovered in 1939, and is one of the large group of piperidine compounds possessing spasmolytic properties. One hundred milligrams administered orally elevates the peripheral pain threshold within fifteen minutes, reaches a peak of fifty per cent in one hour, gradually subsiding in six hours. It has no effect upon the size of the pupil or upon the ocular accommodation; however, some corneal anesthesia may accompany its use.

The following comparison, clinically, is that of demerol and morphine:[7]

	Demerol Hydrochloride	*Morphine*
1. Nausea and vomiting	Slight.	Fairly common.
2. As preoperative drug	Synergistic to anesthesia. Slight depression of respiration, blood pressure, and pulse.	Depressing to respiration, blood pressure and pulse.
3. Constipation	None.	Common.
4. Action	Combined action of morphine and atropine.	Atropine usually added.
5. Analgesia	Equal to that of morphine but with less depression.	
6. As postoperative drug	May be used frequently with little danger of addiction or habituation.	Caution against addiction and habituation.

In this discussion, let us think of ocular surgery as first, sight-saving; second, palliative or corrective; and third, destructive. The choice of the anesthetic in definite procedures will differ. For example, in most intra-ocular operations, cataract removal specifically, it is of paramount importance that the incidence of postoperative vomiting be reduced to zero. Therefore, it follows that opiates are contraindicated. If a destructive operation is to be performed, however, let us say an evisceration or an enucleation, it matters not if emesis does ensue. Morphine may be used to the limit of tolerance. Vomiting will have no effect on ultimate vision, as there will be none; the eye has been destroyed. Hall takes a different view and states that pentothal sodium is the anesthetic of choice in cataract and other intra-ocular surgery.[8]

It is common knowledge that the use of a drug from the barbituric group renders the patient less apprehensive; in fact, it also lessens fear and often counteracts some of the toxic action of the anesthetic agent.[9] Most drugs used for instillation anesthesia in eye surgery are synthetic, cocoaine being the exception. It might be well to digress and mention that more than one drop of the anesthetic at a time is wasted in the eye, as the conjunctival sac will hold no more than this amount when combined with the normal amount of tears. Synthetic drugs that may be used are novocaine 0.5-2 per cent (procaine), holocaine 2 per cent, butyn 2 per cent, and pontocaine 1.5-1 per cent with the least amount of irritation with epiphora and conjunctival congestion. Pontocaine hydrochloride (brand of tetracaine hydrochloride and a derivative of procaine) combined with chlorbutanol 0.4 per cent for sterilization is readily soluble, of low toxicity, and withstands boiling without deterioration. Its action is quick (two drops of 0.5 per cent solution in the eye before the patient enters surgery, four drops in quick succession, and the operation may be started).[10]

The alkaloid of cocaine is the most commonly used as a local anesthetic, although cocaine borate possesses greater stability. O'Brien advises injection of 2 per cent cocaine subjunctivally above the limbus.[11] We use it only as instillation anesthesia in strength of 4 per cent, remembering that it does cause ischemia, dilates the pupil, aids in paralysis of accommodation, and may dessicate the corneal epithelium; so employment of some wetting agent, as boric acid, normal saline, or water, must be applied by a watchful assistant.

In ordinary ophthalmic office and clinic procedures, such as removal of foreign bodies in the ocular or palpebral conjunctiva and those embedded in the cornea, 2 per cent butyn may be instilled. Butyn 2 per cent is our first choice because it is non-toxic, causes a minimum amount of smarting or irritation, action is rapid and prolonged enough for the procedure contemplated, and it has no effect on pupillary action, tension, and does not devitalize the cornea. Butyn 2 per cent has proved adequate in the so-called dirty wounds of the ocular conjunctiva caused by greasy tools or other metallic or non-metallic objects, where, when the foreign body itself is removed, dirt or other foreign material remains which must be removed by excision. The same agent is used with success for superficial anesthesia for operating upon pterygiae, conjunctival flaps, and in perforating injuries to the cornea with vitreous loss. If the eye is not too inflamed, it also may be used for paracentesis of the cornea.

When any operation in which manipulation of the iris is contemplated, as an iridotomy, removal of part of the iris as an iridectomy, for preliminary cataract extraction, Elliott trephine, iris prolapse from operation or trauma, a small wheel of 2 per cent novocaine with 2 drops of adrenalin to the cubic centimeter is injected subconjunctivally 4-5 millimeters away from the limbus at the operative site. This maneuver eliminates the pain incident to tugging and manipulation of the iris, and therefore greatly facilitates the operative procedure.

To increase surface anesthesia, a retrobulbar injection of 1-2 cc. novocaine, 0.5-2 per cent solution, with two drops adrenalin 1-1000 to each cubic centimeter, is made within the muscle

cone preliminary to cataract surgery or any intra-ocular operation where the procedure will cause traction on extra-ocular muscles.[12] This injection may be made through the cul-de-sac or through the lower lid. This procedure renders the eye-ball soft, and thereby enhances not only the possibility of a much less difficult operation, but also a more satisfactory result, as there is less tendency to vitreous loss.

Infiltration Anesthesia

A word about infiltration anesthesia in ocular surgery. Our choice has been novocaine ½-2 per cent with or without adrenalin either for field or nerve block. Scar tissue cannot be satisfactorily infiltrated by any local anesthetic. Chalazia may be operated painlessly by instillation or surface anesthesia of choice, plus infiltration of novocaine ½-2 per cent along with everted lid in the cul-de-sac in a wide area surrounding the chalazion. This procedure usually suffices.

When it is desirable to prevent squeezing of the lids, some modification of the Van Lint block of the temporofacial division of the facial nerve as that suggested by O'Brien is employed.[13] Akinesia also may be brought about by injecting the anesthetic around the orbital rim above and below starting lateral to the external canthus and injecting above and below without withdrawing the needle from the original skin puncture. This is the original Van Lint method of blocking the orbicularis oculi muscles.

A few remarks about general anesthesia in ocular surgery. Evipal was discovered in 1932, and is a member of the barbiturate family, indicated in well chosen cases of minor surgery.[14] It is contraindicated definitely in debilitated and cachetic patients or in patients suffering from toxemia, septicemia, bronchiectasis, hypotension, peritoneal infection or ileus. The drug should not be used where liver function is known to be impaired, for evipal is detoxicated in the liver.[15] Lyle and Fenton state that evipal lessens intra-ocular tension and is desirable for operations in acute glaucoma. When used intravenously, a 10 per cent solution is given based upon the weight of the patient.[16] A patient weighing 150 pounds would receive 8/10-9/10 grams as a maximum dose. It is usually administered immediately prior to the operative procedure because of its short duration and induction period. Premedication is not advocated except to alleviate fear. Likewise the barbiturates are eliminated. The technique must be meticulous. The first 4 cc. of solution should be injected at the rate of 1 cc. in fifteen seconds. Anesthesia usually is complete in one minute if the above technique is followed. However, if the drug is given too slowly, it may be detoxicated as quickly as it is administered, with the result of no anesthesia. Conversely, respiratory arrest may occur if it is given too rapidly. Once the patient is asleep, a small amount of evipal may be injected through the needle in situ into the vein. If some type of general anesthesia is employed in reconstructive plastic surgery about the lid, the landmarks are not distorted. This is particularly true in lid margin involvement.

The barbiturates were first used intravenously in 1929, beginning with sodium amytal, then nembutal, and in 1932, evipal, as previously mentioned.[17] Sodium pentothal was introduced in 1932, and was used by Lundy in 1934.[18] This drug is a sodium salt and is 30 to 50 per cent more potent than evipal and

produces a better anesthesia. It is not advocated for children under nine years of age because children require larger doses than adults.[19] For those over that age, and for the very old, devoid of hypertension, it is considered an ideal anesthetic. On account of the small amount needed, the normal metabolic functions are not disturbed. Opiates are not advisable preoperatively, but atropine is important as it helps prevent laryngospasm.[19] Oxygen can be given in all instances either by mask or catheter.[20] Even in emergencies the stomach should be emptied before administration. When indicated, metrazol or coramine can be used to promote quick recovery.[21]

We employ the continuous drip method of administration of sodium pentothal. The cannula is suspended from a standard and sterile equipment is placed on a table nearby in readiness to give the anesthetic as soon as the operation is begun. Sodium pentothal is prepared in .5 gm. and 1 gm. ampules. A 1 per cent solution is prepared first by using 15 cc. of sterile normal saline solution to dissolve a 1 gm. ampule of the drug. Then 85 cc. of normal saline is placed in the cannula and tubing, followed by the 15 cc. of mixed solution which is added, the total being 100 cc. of solution containing one gram of the drug. This, as you know, makes a one per cent solution. This solution is allowed to drip fairly rapidly until the patient loses consciousness. The remaining solution in the cannula is diluted to a ½ per cent solution by adding the same amount of normal saline solution as there is solution in the cannula bottle. The degree of lid tone and depth of repirations are guides in determining the depth of anesthesia. A nasopharyngeal airway may be used to advantage in these cases.[22] These airways can be made satisfactorily from rubber tubing, using a piece of tubing about 30 cm. or one foot in length, and cutting a long fenestra in the upper wall midway of its length. Each end of the tube is beveled. This airway is to be well lubricated before being inserted.

Intravenous administration of any barbiturate may be dangerous, because of the depression of the respiratory center with the lack of impending signs of respiratory failure.[23] The postoperative sequelae may be serious following any intra-ocular operation requiring prompt resuscitative measures by the physician and nurse.

Rectal Anesthetic

Avertin, a tribromethanol chemical, is a rectal anesthetic, and when prepared according to the instructions given by the manufacturer, provides a satisfactory basal anesthetic, but it has its limitations and must be supplemented by another anesthetic as proper dosage is often inadequate.[24] The dose is calculated by giving 50-100 milligrams per kilogram of weight.[25] Blood pressure must be taken constantly by an alert anesthetist. Distilled water must not be heated over 104° Fahrenheit, nor should the mixture be allowed to cool below that temperature. The drug must be measured accurately, according to calculated dosage, with a Luer syringe, and added to a glass receptacle containing water previously heated to 104° Fahrenheit, and well shaken until all globules of avertin have disappeared. The solution should be prepared immediately before its use and tested with Congo red. Should the solution become a pure orange-red color, the indication is that decomposition has

not developed. This color is also a manifestation of proper preparation.

The rectal injection is given twenty to thirty minutes before the operation is scheduled, preferably in the patient's room. It is important to inject it at a slow rate, taking five to ten minutes for the injection. The funnel method is used. Precaution: The fluid should be introduced into the lowermost part of the bowel as high and rapid injection may saturate the blood stream with the anesthetic and cause an undue fall in blood pressure and bring about respiratory depression. Unconsciousness is produced quickly and quietly. In a few minutes the eyelids close and the patient responds languidly after five to ten minutes, if at all. Basal doses below 80 or 90 milligrams usually require supplemental anesthetics of choice. In the case of patients suffering from liver impairment, bilateral kidney impairment, or rectal lesions avertin is considered to be absolutely contraindicated. Modification of the dose is indicated in the elderly, cachectic, the dehydrated and obese individuals. The patient should receive an enema the night preceding the operation, but this may be omitted in an emergency, since the retained fluid would interfere with proper absorption of the avertin.

In conclusion, I borrow from Walter S. Atkinson the potent, but may I say not entirely accepted, basic concept of anesthesia for surgery of the eye today. If local anesthesia is carefully chosen for each operative procedure and properly administered, practically all ophthalmic operations may be performed under local anesthesia.[27]

Finally, may I express my appreciation for the help rendered by nurse anesthetists in the field of ophthalmic anesthesia.

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Abstracts

It is the aim of this department to bring before our readers the most recent publications which we believe are of most practical value to the nurse anesthetist. We shall also endeavor to call to your attention articles not so recently published that are of lasting interest. Some articles will be merely listed; others will be abstracted. Wherever practical abstracting will be done by the use of direct quotations. Contributions and suggestions will be most welcome.

Heard, Kenneth M.: "The Benefits and Hazards of Pentothal Anesthesia," *Anesthesiology,* September, 1944.

"Pentothal will this year celebrate its tenth birthday. Like any husky ten-year-old, it requires careful handling. . . . What exactly is the role of pentothal in the entire anesthetic picture—a complete anesthetic in its own right or an adjuvant to inhalation and regional agents? The answer is, of course, 'both.' . . .

"It is not a question of what CAN be done with pentothal, but what SHOULD be done. What then are the contraindications? . . . One of the pitfalls of pentothal is its seeming simplicity. It sounds so easy that many, with relatively immature anesthetic judgment, may be tempted to try it in cases and operations for which it is not ideal. . . .

"There is, however, one definite contraindication which transcends all others. . . . It is: inability to maintain a clear airway, whether that inability arises from the physical condition of the patient, the site of operation or failure of the anesthetist to realize that, actually, he is not succeeding in keeping the air passages open. In any anesthetic, one of the best measuring rods of the anesthetist is the degree of oxygenation of his patient. For the man who does not rate highly by this standard, there are safer anesthetics than pentothal.

"Damage to the liver would seem to be one danger signal, since it is apparently accepted that pentothal is broken down, at least to a certain degree, in that organ. Clinically, we have not found that to be the case. One of our common methods in operations on the gallbladder is combined pentothal and spinal. The usual dose is 0.5 to 0.75 Gm. over a period of about one and one-half hours. . . .

"If anoxemia is allowed to persist for any reason, damage to the liver, kidney, brain, or myocardium may be just as great as with other agents which may have a more specific toxicity for these organs. . . . It is always possible, however, that the dose necessary for the operation in hand may exceed the metabolic reserve of the patient, with undesirable or dangerous effects. Five such cases have been encountered. Three were merely slow recovery, presumably because of inability of the liver to cope with the dose to which it was subjected. (Five case reports are given here.)

"From these cases a good guiding principle emerges: it is not desirable to exceed 1 Gm. in a healthy, robust individual nor 0.5 Gm. to 0.75 Gm. in an elderly, debilitated or toxic patient, even though the operation and anesthetic may be proceeding uneventfully. . . . Pentothal appears to have no harmful effect upon the heart. However, anoxemia resulting from administrative difficulties may cause serious damage to

even a good heart or the gravest results in an already weakened one. . . ."

In regard to the twitching sometimes seen in pentothal anesthesia, the author says "Twitching is a nuisance, not a danger. Operating is always difficult and frequently must be abandoned or continued under inhalation anesthesia. This is, indeed, the wisest course once a patient has been found to be a twitcher, since the reaction is the result of an idiosyncrasy to the drug and will only be intensified by further dosage. Fortunately, less than 10 per cent of patients appear to be sensitive to pentothal in this way, as compared to very much larger numbers with other barbiturates. Robust, young adults are the worst offenders. . . .

"A much more frequent complication, the dangers of which have already been stressed—but by no means too strongly—is anoxemia caused either by overdosage or obstruction. Overdosage always results in respiratory depression or stoppage. The avoidance of obstruction is a greater problem with pentothal than with inhalation agents because, even with good relaxation, the cough and pharyngeal reflexes are seldom completely abolished. Only occasionally will an intrapharyngeal airway be tolerated; coughing and straining following its introduction will usually upset the previously good working conditions. On theoretical grounds, atropine is used in about one quarter of cases; there has not been any convincing evidence of its benefit. We prefer, instead, to concentrate on the elimination of obstruction or mechanical irritation by scrupulous attention to the jaw.

"In the treatment of obstruction, oxygen is of the utmost value and no prolonged or difficult procedure should be commenced without it being available for immediate use. The extension of this rule to include every pentothal anesthesia might limit the application of the drug but would certainly prevent many complications. . . .

"The pentothal-spinal combination depends on spinal relaxation and pentothal amnesia. It requires a complete spinal anesthesia of sufficient height and duration to allow the operation to be completed successfully but not necessarily in comfort. The latter is supplied by the pentothal which must be administered continuously in minute doses—just enough to keep the patient in a drowsy, euphoric state, with a happy disregard of his surrounding. . . .

Summary

"In 8,500 pentothal administrations, three deaths and most major complications were caused by obstruction of the air passages. When the airway was properly maintained, little harm followed even large doses. In only five cases was any metabolic change suspected. However, the maximum desirable dose is approximately 1.0 Gm., and if this is exceeded, the outstanding benefits of pentothal need not be expected. The combination of pentothal with nitrous oxide, cyclopropane or spinal anesthesia is, in many cases, preferable to the use of those agents alone. Methods by which this can be accomplished with readily available apparatus are described."

Kleinman, Marcus: "Abdominal Relaxation in General Anesthesia." *Current Researches in Anesth. and Analg.*, Sept.-Oct., 1944.

"In the performance of an operation the safety and comfort of the patient is of primary importance. . . . In abdomi-

nal operations muscular relaxation is the goal to be desired and, unless such relaxation is obtained the surgeon is unable to operate efficiently.... Deep anesthesia with complete muscular relaxation may result in failure of the peripheral circulation as a result of the abolition of the normal tone of the muscles. As a consequence, shock of varied severity may ensue.... In general, it may be said that it is the function of the anesthetist to provide for the surgeon the maximum abdominal relaxation compatible with the patient's safety. Unfortunately complete abdominal relaxation depends on many factors over which the anesthetist may have no control. Some of these factors will now be considered.

"MUSCULAR FLACCIDITY is the most important factor in satisfactory abdominal relaxation.... Spinal reflexes disappear beginning at the lower end of the spinal column and extending upward towards the brain. This explains the necessity for deeper anesthesia in operations in the upper than in the lower abdomen.

"Muscular flaccidity also depends on muscular tone. Therefore, it is more readily obtained in old or weak patients....

"Cyclopropane affords good relaxation by suppression of reflex muscular spasm through the spinal cord and by diminishing respiratory movement due to a depressive effect upon the respiratory system. However, even in deep anesthesia this agent does not diminish muscular tone. Surgeons who prefer cyclopropane anesthesia should understand that this agent will not provide the same degree of muscular flaccidity afforded by chloroform or ether.

"Additional factors which play a role in muscular flaccidity are anoxia and carbon dioxide in the circulation. Both of these factors act as stimuli for muscular tone. Increase in carbon dioxide in the circulation and anoxia usually act together and eliminate the possibility of satisfactory muscular relaxation even in deep anesthesia.

"Nitrous oxide and ethylene are weak anesthetics and do not afford muscular flaccidity.... Frequently good muscular relaxation in conjunction with general anesthesia may be obtained by injection of a small amount of 1 per cent procaine in the abdominal muscles....

"VISCERAL STILLNESS is also necessary to afford satisfactory abdominal relaxation for surgical procedure. To some extent visceral stillness is dependent upon muscular flaccidity. However, other factors enter in, of which the most important is the patient's respiration....

"In closed system anesthesia, when there is insufficient soda-lime absorption of carbon dioxide, a deep abdominal type of respiration may result with consequent protrusion of viscera through the incision....

"The most frequent and the most important cause of failure in obtaining visceral stillness is respiratory obstruction.... The most important cause of respiratory obstruction, however, is laryngospasm which occurs frequently and is difficult to combat.... Partial laryngospasm may be relieved by deepening the anesthesia, adding helium or exerting increased pressure in the anesthesia bag. With complete laryngospasm it is necessary to resort to artificial respiration and to intubate the patient at once.

"CELIAC REFLEX, caused by stim-

ulation of the celiac plexus in sympathotonic patients, is manifested by a stiff abdomen and protrusion of abdominal viscera. This results in complete absence of abdominal relaxation which cannot then be achieved even with dangerously deep anesthesia. Celiac reflex may yield to the injection of physostigmine.

"WHEN VISCERAL VOLUME is increased by marked meteorism there is interference with operative technique even in the presence of good abdominal relaxation. Protrusion of viscera occurs. For this reason general anesthesia is frequently unsatisfactory for intestinal obstruction. The same difficulty is sometimes encountered in operations for postoperative abdominal evisceration. . . .

"VISCERAL INCARCERATION frequently occurs during abdominal operations utilizing small incisions. This condition is not the result of failure to obtain complete abdominal relaxation. It is merely a physical phenomenon due to the difficulty in returning the visceral contents into the abdomen through a small incision.

"SUMMARY. A review has been offered of the numerous and frequently complex factors that may interfere in obtaining satisfactory abdominal relaxation with general anesthesia. The cardinal concept of anesthesia administration is that the degree of obdominal relaxation must not be incompatible with the safety of the patient."

Recommended Reading

Waters, Ralph M.: "Nitrous Oxide Centennial," *Anesthesiology,* Vol. 5, No. 6, November, 1944.

Hudon, Fernando: "Four Hundred and Ten Cases of Goiter Under General Anesthesia with Pentothal," *Current Researches in Anesth. & Analg.,* Vol. 23, No. 5, Sept.-Oct., 1944.

Seeman, George F.: "General Anesthesia in Oral Surgery," *Current Research in Anesth. & Analg.,* Vol. 23, No. 6, Nov.-Dec., 1944.

Kroger, William S., and DeLee, S. T.: "The Use of the Hypnoidal State as an Amnesic, Analgesic and Obstetric Agent in Obstetrics," *Am. J. Obst. & Gynec.,* 46:5, 655 (Nov.) 1943.

IN MEMORIAM

Sr. St. Henry of St. Mary's Hospital, Green Bay, Wisconsin, died on February 7, 1945. Sr. St. Henry had been a member of the Wisconsin and American Association of Nurse Anesthetists since 1941.

Mrs. Myrtle Birdella Hanson Day of Cleveland, Ohio, died on November 30, 1944. Mrs. Day was a graduate of the School of Anesthesiology of Grace Hospital, Detroit, Michigan. She became a member of the Ohio and American Associations of Nurse Anesthetists in 1939.

Mrs. Beulah Dodds Wagner of 14 Kenmore Road, Douglaston, New York, passed away receently. Mrs. Wagner, who was graduated from the School of Anesthesiology of Charity Hospital, New Orleans, Louisiana, had been an Active Member of the American Association of Nurse Anesthetists and the New York State Association of Nurse Anesthetists since 1940. She was formerly employed at the Manhattan Eye, Ear and Throat Hospital, New York.

Activities of State Associations

Alabama

Mrs. James F. Rushing of West End Baptist Hospital, Birmingham, is now Secretary of the Alabama Association of Nurse Anesthetists. She replaces Mrs. Ima McKenzie Hicks, who has resigned.

California

The tenth annual meeting of the California Association of Nurse Anesthetists was held March 17th at the Sir Francis Drake Hotel, San Francisco. A banquet, preceding the business meeting, was attended by thirty-two members and six guests, including representatives from E. R. Squibb and Sons, The Ohio Chemical Company, the Western Hospitals Association and Lieutenant Dragus from the Navy Personnel Bureau. Lieutenant Dragus gave an interesting talk on the experiences of Navy Nurses and the need for more in the service.

Mrs. Mae Rowland, President California State Association

President Katherine Graham presided at the business meeting. Mary Bell Fusilier, Secretary-Treasurer reported a total membership of 200 and a bank balance of $622.77.

Officers elected—President: Mrs. Mae Rowland, Alameda Hospital, Alameda; First Vice-President: Edna M. Peterson, 1106 Bush Street, San Francisco 9; Second Vice-President: Madeleine Arent, 309 Central Avenue, Oakland 9; Secretary-Treasurer: Mrs. Cleo Duncan Bopp, 2801 East 16th Street, Oakland 1; Trustees: (3 years) Edith H. Jones; (2 years) Vera M. Anderson; (1 year) Mrs. Katherine H. Graham.

Colorado

The Colorado Association of Nurse Anesthetists elected the following officers at the December meeting:

President—Mrs. Henrietta Moon, 950 Marion Street, Denver
First Vice-President—Mrs. Louise Allen, 1212 Cherry Street, Denver
Second Vice-President—Lelia Mullen, 1914 Pearl Street, Denver
Secretary-Treasurer—Frances A. Nelson, 759 Milwaukee Street, Denver
Trustee (3 years)—Mrs. Ann Stevens
Trustee (2 years)—Mrs. May Carpenter
Chairman of Membership Committee—Mrs. May Carpenter
Chairman of Program Committee—Ethel Currie

Georgia

Mary E. Hyatt, 56 Fifth Street, N.E., Atlanta, has assumed the duties of Secretary for the Georgia State Associa-

tion of Nurse Anesthetists. Miss Hyatt is taking the place of Mildred Davis who has entered the armed services.

Illinois

A meeting of the Illinois State Association of Nurse Anesthetists was held Thursday evening, March 22nd, at the North Avenue and Larrabee Y.M.C.A., Chicago.

Sister Borromea of St. Francis Hospital, Peoria, read a paper on "Curare." Myrna Willenborg, of Michael Reese Hospital, and Mrs. Gladys Hoffman Calhoun, of Englewood Hospital, both of Chicago, gave reports on the "Continuation Course for Nurse Anesthetists" at the University of Minnesota Graduate Center.

It was reported that there are 309 members of the Illinois Association. Several more members have entered the Armed Services.

One of the projects of the past year has been a class in Parliamentary Procedure conducted by Mrs. Clarence Goodwin, Parliamentarian. The class, which was held at the Illinois Federation of Women's Clubs, Chicago, was open to members of the State Association.

Refreshments and social hour followed the meeting.

Kansas

The Kansas State Association of Nurse Anesthetists held its fourth annual meeting on November 14th and 15th, 1944, at the Allis Hotel, Wichita, Kansas, in conjunction with the Kansas State Hospital Association. The address of welcome was given by H. J. Andres, President of the Kansas Hospital Association.

President Viola Baker presided at the first general session and gave a report of the Cleveland Convention. Neola Kanauer, x-ray technician, Wesley Hospital, Wichita, reported on the Cleveland meeting of the American Hospital Association.

Interesting exhibits were displayed by Alma Kottal and Katherine Gordon, anesthetists of St. Francis Hospital, Wichita. Sister Geraldine of St. Rose Hospital, Great Bend, exhibited her new Carraway Intravenous Apparatus. A round table discussion was followed by dinner at the Inness Tea Room.

Wednesday morning, November 15th, was left open for visiting hospitals.

Senja Mikkola, of Wesley Hospital, Wichita, presided at the afternoon session, at which the following papers were presented:

"The Use of Curare"—D. V. Conwell, M.D., Wichita.

"Penicillin Therapy"—R. P. Norris, M.D., Resident Physician, Wesley Hospital, Wichita.

"Pentothal Sodium in Obstetrics"—G. R. Tonn, M.D., Wesley Hospital, Wichita.

Officers elected were

President — Ella H. Risser, Bethel Hospital, Newton

First Vice-President — Mrs. Ethel Paul, Wesley Hospital, Wichita 6

Second Vice-President—Clara Weiser, St. Francis Hospital, Wichita 5

Secretary-Treasurer — Alma Kottal, St. Francis Hospital, Wichita 5.

Historian—Viola Baker

Louisiana

Ione E. Cenac, Eye-Ear-Nose and Throat Hospital, New Orleans 12, has assumed the duties of Secretary for the Louisiana State Association of Nurse Anesthetists.

Michigan

The Michigan State Association of Nurse Anesthetists held a meeting on February 17, 1945, at the Nurses' Home at St. Joseph's Mercy Hospital, Detroit. There were fifty members present.

The following papers were presented:

"My Experiences in the Use of Cyclopropane" by Marion Weigand, R.N., M.A.A.N.A., Traverse City, Michigan.

"Curare in Anesthesia" by Rita M. Walsh, R.N., M.A.A.N.A., St. Mary's Hospital, Detroit, Michigan.

"The Cardiac Patient Under Anesthesia" by E. Christine Costley, R.N., M.A.A.N.A., Mt. Carmel Mercy Hospital, Detroit, Michigan.

Members of the State Assocaition at St. Joseph's Mercy Hospital served refreshments after the meeting.

Minnesota

The January meeting of the Minnesota Association of Nurse Anesthetists was held on Tuesday evening, January 30, 1945, at Miller Hospital, St. Paul. There were seventeen members and three visitors present. The business meeting was followed by a discussion of the "Nurse Practice Act" by Ragna Gynild. Margaret Heterdek, a student nurse at Miller Hospital, played two piano solos. Refreshments were served by the anesthetists of Miller Hospital.

The February meeting of the Minnesota Association of Nurse Anesthetists was held Tuesday evening, February 27th, at Deaconess Hospital, Minneapolis. There were fourteen members and four visitors present. Plans for the annual meeting of the Association, which will be held May 4th and 5th at the Nicollet Hotel, Minneapolis, were discussed. Palma Anderson is to be Chairman of the Program Committee. The meeting will be held in conjunction with the Minnesota Hospital Association.

Katherine J. Densford, President of the American Association of Nurses and Dean of the School of Nursing at the University of Minnesota, gave an interesting talk on the Nurses Draft Legislation. Refreshments were served by Palma Anderson, Hazel Peterson and Selma Snobeck.

Program—FIRDAY, MAY 4th

Registration—Nicollet Hotel (No fee)

2:00 P.M.—Business Meeting—Election of officers (Members only)

3:00 P.M.—Greetings from the Minnesota Hospital Association — Dr. Thoma Broadie

3:15 P.M.—"Behavior of Blood Pressure under Anesthesia" Ralph Knight, M.D.

4:00 P.M.—"Uses of Oxygen" Joe W. Baird, M.D.

4:45 P.M.—"Physiology of Respiration, Dealing Mainly with the Carotid Body and Respiratory Centers and Their Relationship to Clinical Anesthesia" A. W. Friend, M.D.

7:00 P.M.—Dinner—Nicollet Hotel

SATURDAY, MAY 5th

2:00 P. M.—Group meeting—Minnesota Hospital Association representing Nurse Anesthetists, Ruth Bergman, Nortwestern Hospital, Minneapolis.

Nebraska

The Nebraska Association of Nurse Anesthetists held its eighth annual meeting on January 2, 1945, at St. Catherine's Hospital, Omaha. President Mrs. Wilhelmina S. Gulotta presided.

The recent transfer of THE BULLETIN, its publication and editorial control, from Cleveland to Chicago, was discussed. The Nebraska Association extended a vote of thanks to the retiring Committee on Publications, Mrs. Gertrude Fife, Chairman; Harriet Aberg, and Mrs. Katherine King Nesbitt. A vote of thanks was also extended to former members of this Committee for their contributions to THE BULLETIN since its inception in 1933.

Due to their devoted service, the pages of our official publication present a striking and important record. THE BULLETIN shows the success and growth of our national organization, as well as the steps by which Anesthesia, in the hands of the Nurse Anesthetist, has met effectively the advancing demands of the surgeon. Recognizing the high standard and momentum gained by THE BULLETIN, the Association can look forward with confidence to its future.

Mrs. Gulotta stated in her annual report that the membership of the Nebraska Association is greater than it has ever been. With the assistance of hospital administrators and due to the active cooperation of our members, every nurse anesthetist in Nebraska who is engaged in Anesthesia and is qualified for membership in the Association, has become a member or filed an application for membership.

Richard Egan, M.D., Professor of Obstetrics at Creighton University Medical School, Omaha, spoke on the growing use and popularity of "Continuous Caudal Anesthesia." Dr. Egan demonstrated the technique and equipment now in use at the University Hospital, Omaha.

A social hour and buffet luncheon followed the program. Hostesses were Sister Mary Kevin, Sister Marcella Kavanaugh, and Marcella Birch.

Officers Elected

President—Mrs. Wilhelmina S. Gulotta, 1734 South 17th Street, Lincoln

Vice-President—Edith Ackerman, St. Joseph's Hospital, Omaha 8

Secretary-Treasurer — Dolores V. Broughton, Immanuel Deaconess Hospital, Omaha 11

Historian—Mrs. Wilhelmina S. Gulotta

Trustees

Agnes G. Hain

Mrs. Laura Nehring Poppy

Ann Almquist

Amanda D. Inselmann

New Jersey

President—M. Catherine Horne
929 Revere Avenue, Trenton 9

Miss Horne has assumed the office of President, succeeding Mrs Helen F. White, resigned. Mrs. White is now in Tampa, Florida.

New York

The New York State Association of Nurse Anesthetists will hold its annual meeting June 11th and 12th at the Hotel Pennsylvania, New York City. Mornings will be devoted to visiting clinics and the afternoon sessions to scientific papers. Anesthetists from all states will be welcome.

Oregon

The January meeting of the Oregon Association of Nurse Anesthetists was held on January 8, 1945 at St. Vincent's Hospital, Portland, with twenty members present.

Dr. Clare Peterson of the Department of Physiology, University of Oregon Medical School, gave an interesting and informative paper on blood pressure.

The monthly meeting of the Oregon Association of Nurse Anesthetists was held Tuesday evening, February 6th, at St. Vincent's Hospital, Portland. There were twenty members present.

The following Nominating Committee was appointed:

Chairman—Mrs. Hazel Wilhelm

Alice O'Brien

Mrs. Muriel Herin

Mrs. Loretta Case presented a paper on Curare and its uses.

A meeting of the Oregon Association of Nurse Anesthetists was held Tuesday evening, March 27th at the Nurses' Home of St. Vincent's Hospital, Portland. There were fourteen members present.

George Ulett, M.D., of the Multonah County Hospital, Portland, gave an interesting talk on psychiatry in which he presented the most recent developments in the field.

The main business of the meeting was the presentation of the report of the Nominating Committee.

DONOR

Agatha C. Hodgins of Chatham, Massachusetts is the first donor of the Association. Miss Hodgins has presented a United States Series-F-Bond, with maturity value of $100.

This gift will be used as the nucleus of a fund, which, at some future date, will be used to further the educational program of the Association. It is hoped that individual members and State Associations will also contribute to this fund.

First Examination of A.A.N.A.

The first examination will be held on June 4, 1945. All applicants whose applications have been passed by the Committee on Credentials have been notified. Any applicant whose application has been approved by the Committee on Credentials prior to May 1, 1945 and received at the Executive Office by May 1, 1945 may take the first examination. Because of the time factor involved in making the necessary arrangements and preparing the examination we regret that we cannot accept candidates for the FIRST examination after this date. The date of the second examination will be published in the August issue of the Journal.

—Miriam Shupp, Chairman Committee on Examinations.

Status of the Student Anesthetist

Students enrolled in the Schools of Anesthesia and nurses wishing to take a course in anesthesia are asking whether or not they would be classified as essential by the War Manpower Commission for such postgraduate training.

This question was presented to Miss L. Louise Baker, Assistant Executive Officer Nursing Division, Procurement and Assignment Service, Washington, D. C. The following directive is being issued to all Schools of Anesthesia. Miss Baker is asking the schools to request a classification before the nurse enrolls, and she states that if there is any difficulty in obtaining this classification, that it be reported to her office.

WAR MANPOWER COMMISSION
Procurement and Assignment Service
Washington 25, D. C.

February 8, 1945.

To: Local and State Committees for Nurses

From: Directing Board, Procurement and Assignment Service

Subject: Classification of Nurses Enrolling in Postgraduate Courses (Nursing Information No. 13, Revised)

The urgent need for nurses in the Army and Navy Nurse Corps makes it imperative that the classification of all nurses enrolled or about to enroll in postgraduate programs be carefully reviewed, and that the number classified as essential for postgraduate study be kept at a minimum until military needs are met.

Local and State Committees have the responsibility of classifying graduate nurses prior to their enrollment for postgraduate study. The nurse is to be classified by the Committee under whose jurisdiction she was last employed or where she completed her basic course if she has not been employed.

A nurse may be classified as essential for postgraduate study, whether she is receiving federal funds or paying her own expenses, under the following conditions:

1. The length of the course is not more than one year, and less if possible.

2. She graduated prior to January 1, 1944, and submits a statement to the Local Committee from her future employer that she has been accepted for a definite essential position for which she needs further preparation.

3. She has been graduated since January 1, 1944, and is *not eligible* for military service, and submits a statement from her future employer that she has been accepted for a definite essential position for which she needs further preparation. In some few cases, the Committee may feel that an essential classification should be given an *eligible* nurse graduated in 1944, because she is already enrolled in a postgraduate program and has accepted a definite essential position.

The nurse taking postgraduate work on a part-time basis while holding a position is to be classified as to her essentiality in her *position*.

The State Committee should send a copy of this directive to all agencies and educational institutions within the state accepting students for postgraduate study.

Report From the Executive Office

ANNE M. CAMPBELL

Executive Secretary

We have had addressograph plates made for mailing purposes. We are eager to have the addresses correct. This office should be notified if your address is incorrect, or your name is incorrectly spelled. In the future, we should be informed promptly of changes of address. If your address is one at which you will receive mail, please use it in the future in writing us and in paying dues. Sometimes we receive a hospital address and sometimes a street address for the same person, and often the street address given is that of the hospital. Each change of address necessitates a new addressograph plate, and we therefore ask you to be consistent in addresses furnished us.

JOURNALS are mailed second class and cannot be forwarded. We receive many notices from the post office of undelivered *JOURNALS*. Sometimes the post office furnishes the forwarding address, often it indicates that no forwarding address was left. This causes delay in receiving your *JOURNAL* and necessitates considerable clerical work in this office—more reasons for notifying us promptly of your change of address. If your change of address is temporary, please indicate this and notify us of your permanent address as soon as possible.

TRANSFERS

Due to wartime conditions we receive many changes of address from state to state. We assume these to be transfers and, after notifying the National Treasurer and State Secretaries, discover the address to be temporary. If you move from state to state and your membership should be transferred, this information should be included in your change of address. If you are in the Armed Services, or with your husband in the Armed Services, your membership is maintained in the state of your permanent residence. This information should also be given with your notice of change of address.

Report on Applications

Since the annual convention in October, 1944, the Committee on Credentials has passed on the following applications which were received prior to October 15th and were considered under the 1942 By-laws.

Accepted—222

Rejected—11 (Two of these are being reconsidered)

The following have been acted upon under the By-laws adopted in 1944.

Approved for examination—40

Rejected for examination—11 (Two of these are being reconsidered)

Accepted for Inactive Membership—32

Rejected for Inactive Membership—2

Deferred applications reconsidered for examination—46

Deferred applications approved for examination—41

Re-applications submitted for consideration—17

Total new applications submitted—53

Recommendations on all of the last two groups have not been received.

Total approved for examination—81

New England Assembly of Nurse Anesthetists

The meeting to organize a New England Assembly of Nurse Anesthetists, which was to have been held in March, at the Hotel Statler, Boston, was cancelled because of recent rulings by the Office of Defense Transportation. The convention of the New England Hospital Assembly was also cancelled.

MEMO TO THE ANESTHETIST:

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— Wilson Soda Lime

Genuine Wilson Soda Lime is more than "just soda lime." It is the standard CO_2 absorbent of the medical profession, proved by more than a quarter-century of satisfactory use, backed by unflagging research and rigid laboratory control. It meets U. S. P. specifications. Safe, economical, easy to use, it is conveniently packaged and is available in two moisture grades, three mesh sizes, with indicator if desired. — A product of Dewey and Almy Chemical Company.

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Wilson Soda Lime

Institute for Instructors of Anesthesiology

The Office of Defense Transportation has granted the Association permission to hold an Institute for Instructors of Anesthesiology, provided no more than 50 out-of-town members attend.

Information setting forth the purposes and giving full details has been sent to the directors of Schools of Anesthesiology. Announcement concerning the time and place cannot be made until questionnaires concerning the Institute are returned. Preference will be given to applicants in the following order:

A. Directors and Instructors in Schools of Anesthesiology.

B. Nurse Anesthetists actively engaged in the administration of anesthetic agents.

C. All member nurse anesthetists who have been or who are in the Army or Navy.

Mrs. Esther Myers Stephenson, 7 Wolcott Road, Winchester, Massachusetts, is Chairman of the Institute Committee. All inquiries and correspondence concerning the Institute should be addressed to Mrs. Stephenson.

Institute for Instructors of Anesthesiology

(place) (date)

APPLICATION

Name..... Title.....

Hospital Name..... Address.....

Educational Record:

	Name and address	Dates		yes or no
High School		from	to	diploma
School of Nursing		from	to	diploma
School of Anesthesiology		from	to	diploma
College or University		from	to	diploma

If you are an undergraduate in a college or university how many credits have you earned?.....

What is your particular interest in attending the Institute?.....

.....

Indicate first and second choice of type of room you wish reserved:

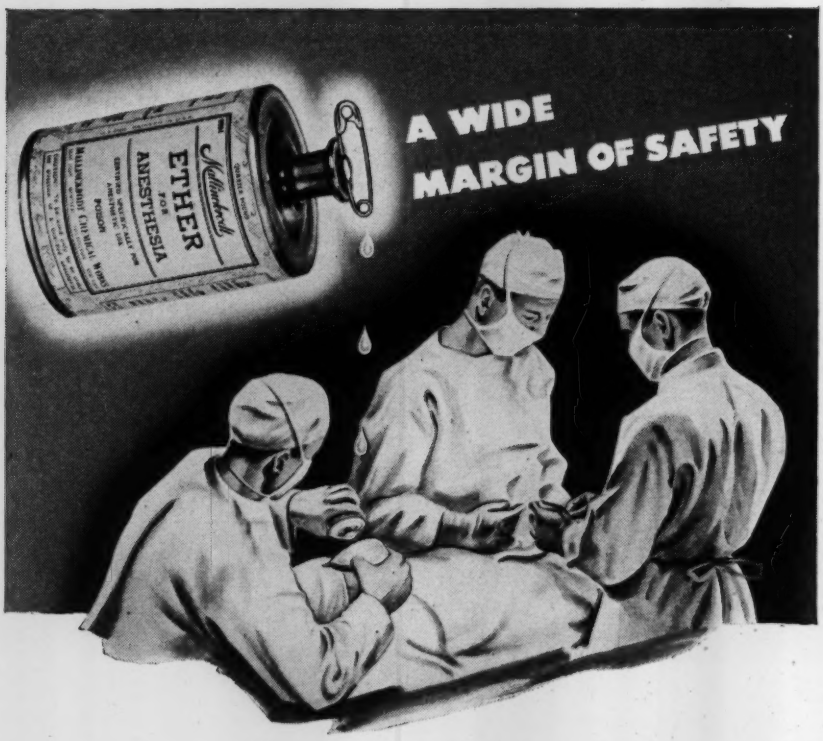
First Choice..... Second Choice.....

If you wish to share a double room with another member, state her name.....

.....

Please state date and approximate time of arrival.....

Please enclose fee of $5.00 and send to Esther Myers Stephenson
7 Wolcott Road, Winchester, Mass.



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The oxygen tent provides simultaneously the benefits of oxygen therapy and the advantages of air conditioning. Cardiacs, and patients who are running high temperatures, frequently are more comfortable when receiving oxygen by tent, where an ideal combination of temperature, relative humidity, and oxygen can be provided.

When using an oxygen tent, the nurse should be in as constant attendance as possible to make certain that the tent canopy is kept tucked tightly under the mattress on all sides, with the front of the canopy well away from the patient's face; that tent sleeves and other openings are kept securely closed when not in use; and that the tent atmosphere is analyzed at frequent intervals for oxygen content as a guide in controlling liter flow. Attention to these points will help to insure the comfort of the patient and the effectiveness of the treatment.

To learn more about correct techniques for operating oxygen tents and other types of admini-stering equipment, write for the Linde Oxygen Therapy Handbook. It will be sent without charge.

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